JANUARY 5, 1953

NEWS ISSUE

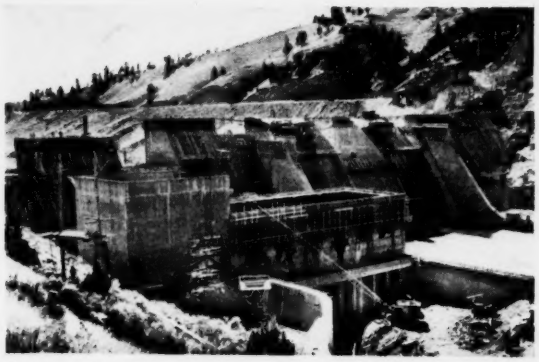
Electrical World

Price 35 Cents

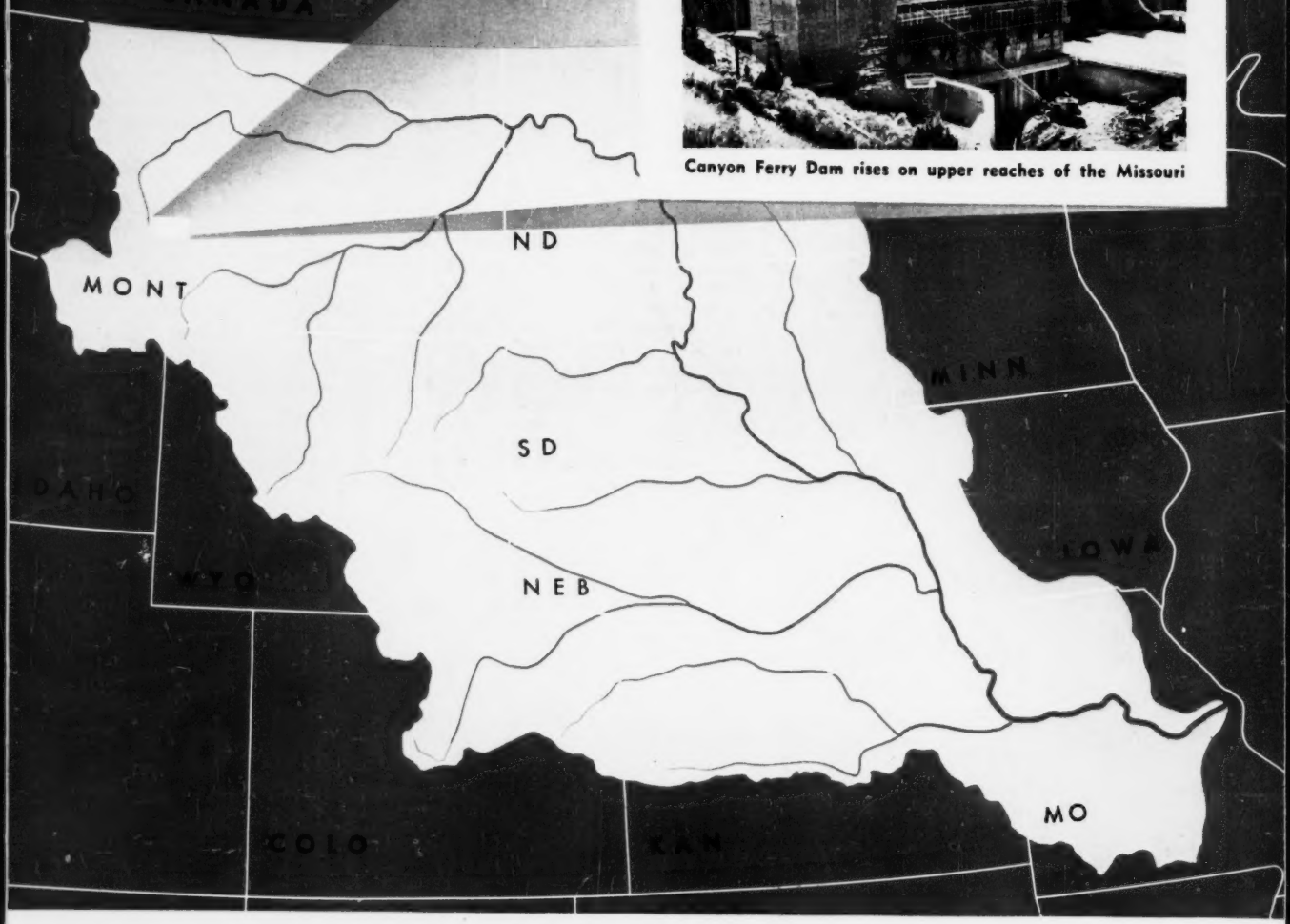
A McGRAW-HILL PUBLICATION

The Missouri: No Waltz for Ike

Page 15



Canyon Ferry Dam rises on upper reaches of the Missouri



Industry Achievements of 1952 . . . Page 7

Utility Fly-Films Philadelphia . . . Page 22

Top Talent, Top Shows, sell ELECTRICITY FOR BETTER LIVING

Constantly whetting the wants of Americans for the better life electricity can bring, the General Electric television and radio shows have been hailed as doing an outstanding promotion and public relations job for the entire electrical industry.

Top-ranking stars, presented in two television shows and one radio program, beamed weekly over nation-wide networks, are welcome visitors in millions of homes. Gay, wholesome entertainment sets the stage for telling the story of electrical equipment and progress under the most favorable conditions. In an atmosphere of friendly intimacy and goodwill, audiences are given a new and broader understanding of the part electricity is playing in our national welfare and a new appreciation of the benefits that come from living the electrical way.

The value of these programs can never be measured in dollars and cents. Perhaps the best indication of their worth may be gathered from the high regard in which they are held throughout the electrical industry. General Electric aims to make them even better in 1953. General Electric Company, Schenectady 5, New York. 301-227

MORE POWER TO AMERICA

GENERAL ELECTRIC

FRED WARING Lavish settings, brilliant direction and talented handling of gay song and dance numbers have caused the Sunday night Fred Waring Show to be named again and again as the best family entertainment of its kind on television. The high caliber of the program reflects the prestige of the electrical industry and insures a receptive audience for the skilfully introduced commercials. At left, Fred Waring is shown with some of the thousands of appreciative letters received from a delighted nation-wide audience.

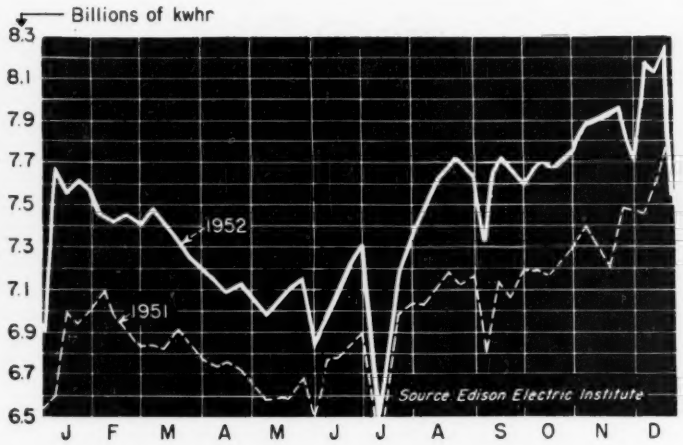
BING CROSBY Songs and patter by the inimitable Bing, Thursday nights, CBS radio network, help sell electrical appliances.

JOAN DAVIS Star of "I Married Joan," latest G-E television show, Joan Davis gets into merry mix-ups Wednesday nights on the NBC-TV network. Above, she tastes something gag writers have cooked up. Show promotes electrical appliances.

VOLUME 139, NO. 1

January 5, 1953

Electrical World



Output Week Ended Dec. 27—7,549,730,000 Kwhr

Per Cent Change From Previous Year

	Total US	New Eng.	Mid. Atlan.	Cent. Ind.	West Cent.	South-east	South Cent.	Rocky Mount.	Pacific NW	Pacific SW
Dec. 27	+9.1	+8.9	+6.8	+10.8	+10.9	+12.8	+11.8	+9.9	−5.7	+9.1
Dec. 20	+5.8	+6.8	+3.0	+7.2	+6.2	+9.9	+3.9	+5.7	−7.7	+10.5
Dec. 13	+6.2	+9.9	+5.5	+7.8	+8.1	+8.7	+4.8	+4.6	−9.0	+7.7

Electric Power Statistics

		Latest Month	Preceding Month	Year Ago
Peak Load (Million Kw)	Sept.	69.7*	69.7	64.7
Capacity (Million Kw)	Oct.	79.70	78.78	74.68
Production (Billion Kwhr)	Oct.	34.82	33.38	32.44
Hydro		7.02	7.36	7.55
Fuel		27.80	26.02	24.89
Fuel Consumption				
Coal (Million Tons)	Oct.	9.92	8.82	9.59
Oil (Million Barrels)		7.16	6.03	5.46
Gas (Billion Cu Ft)		83.08	97.37	71.74
Sales (Billion Kwhr)	Oct.	30.15	30.11	27.68
Residential		7.72	7.66	6.85
Commercial		5.09	5.37	4.65
Industrial		15.16	14.75	14.13
Other		2.17	2.33	2.05
Net Income Class A & B Companies ($ Million)	Oct.	53.67	73.12	65.47
Estimated Dec. 52 Peak (Million Kw)	Sept.	79.7	80.0	80.3
Kwhr per Residential Customer (12 Month Average)	Sept.	2,131	2,119	1,961
Revenue per Kwhr Residential Service 12 Month Average)	Sept.	2.77¢	2.77¢	2.83¢
Canadian Production (Billion Kwhr)	Oct.	5.42	4.99	4.92

Business Statistics

FRB Industrial Production Index †††	Nov.	230	231	220
Gross National Product Annual Rate ($ Billion)	3rd Qtr.	343.4	342.6	337.1
E. W. 5 Industry Production Index	Nov.	128.3	127.4	122.1
ENR Construction Cost Index ††	Dec.	123.2	123.4	114.8
BLS Consumer's Price Index	Oct.	190.9	190.8	187.4
NEMA Insulation Materials Sales Index†	Oct.	599	531	559
NEMA Electric Appliance Sales Index†	Oct.	260	231	305
NEMA Household Refrig. Sales Index†	Oct.	122	136	113

* Estimated. † 1936=100. †† 1949=100 ††† 1937-39=100 (Unadjusted)

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PERFORMANCE and PRICE

of Thorex Arresters Fills Long-Felt Need in Single-Customer Substations

Lightning protection of single-customer substations was, at one time, necessarily a compromise. Arresters of a grade associated with central station protection could not be justified by the class of load. Arresters whose price adapted them to the application were inadequate to provide the dependability of service required by most industrial customers.

For the first time, O-B Thorex lightning arresters offer you the right combination for this common problem. An exceptionally high grade of protective performance is now available at an attractive "popular" price.

Investigate Thorex arresters for your single-customer substations -- you will find they fill a long-felt need.

Ohio Brass

4241-H

MANSFIELD OHIO, U.S.A.

THE ELECTRICAL WEEK

The Issue's News Highlights—Gordon Dean, chairman of the Atomic Energy Commission, predicts first stationary atomic power plants will be designed this year. Said Dean: "1953 will undoubtedly see the design of small reactors for the production of power that may be used in areas where ordinary fuel costs are high."

Defense Production Administration says utilities will get most of the controlled materials they need in the first two quarters of the new year. After that, DPA believes, the picture may be even brighter.

Off the Washington Wire—Capacity additions of electric utilities in 1952 were approximately 1 million kw less than those of the previous year, according to latest Depa estimates. In terms of capability, the agency estimates that Class I utilities installed about 6.3 million kw during 1952 compared with 7.4 million kw in 1951. Material shortage was main reason for setback.

A report to be submitted to Munitions Board will say that 10% power curtailment in Pacific Northwest has had no adverse effect on direct defense production in the area although aluminum production has been reduced.

Depa last week asked NPA to "freeze" schedules of 15 heavy electrical units to assure orderly delivery of these units to utilities which will produce power for atomic energy plants. . . . In a report sent to interested parties, FPC is proposing an interconnection between systems of Thomasville Water & Light Department and Georgia Power Co.

Lea County Electric Cooperative, Lovington, New Mex., gets REA loan totaling $4,145,000 to finance construction of 480 miles of distribution lines, four additional 2,500-kw diesel units, and system improvements including 37 miles of 69-kv transmission line.

In a survey of Pacific Northwest's loads and resources for a period through Jan. 18, Bonneville Power Administration's engineers estimate the energy deficiency will drop each week because of improved storage and streamflow at such powerhouses as Cushman, Alder, Yale, and Baker. For week Dec. 29 to Jan. 4 the deficiency, after allowance for 110,000 kw due to curtailment, was set at 89,000 kw. For Jan. 5 to 11 and Jan. 12 to 18 the deficiency is estimated at 69,000 kw.

Canadian central stations produced a record 5,418,718,000 kwhr in October and primary consumption sets a record 4,927,204,000 kwhr. Production for 1952 is certain to exceed 60 billion kwhr for first time.

From the Southeast—Okefenokee Rural Electric Membership Corp, incorporated in Georgia, asks Federal Court that Florida P&L and Jacksonville's City Utilities Commissioner J. D. Kennedy be restrained from preventing the REA co-op from extending its lines and distributing electricity anywhere except to persons already receiving service or to persons in towns of 1,500 or more.

Construction—Kansas City P&L will spend about $20 million in 1953 . . . Pacific P&L spins second 54,000-kw unit at Yale hydro project . . . Sacramento Municipal Utility District expects to spend $11.6 million in 1953.

Financial—Winnipeg Electric's bondholders will vote Jan. 12 on proposal to sell company's electric assets to the Province of Manitoba.

Foreign—Britain sources say they expect to have the new $14-million "Tornado" atomic power electric plant running in 18 to 24 months. The "Zephyr" breeder reactor to be used for generation of electricity should be working within eight months, they reveal.

Litigation—Iowa Supreme Court orders Iowa Southern Utilities to pay $110,431 in fees and expenses to attorneys who represented stockholders in a suit which cancelled 39,468 shares of ISU stock issued to late George M. Bechtel and members of his family when company reorganized in 1938.

Public Relations and Advertising—All entries in outdoor classification of 1953 PUAA advertising contest must be made on colored slides. This will aid judges in picking winners, and slides can be shown later at association meetings . . . PUAA now has 374 members, an increase of 88 or 31% since 1948. Seven members are from foreign countries, and 14 are women.

Rates—Cincinnati City Council approves new electric rate schedule for Cincinnati G&E. Schedule includes an escalator provision for changes in taxes and labor costs of company . . . Georgia PSC sets hearing Jan. 8 for Georgia Power Co's application to include fuel clauses in rate schedules. PSC also sets hearing Jan. 20 for Georgia P&L's application to increase rates $300,000 gross yearly or $149,572 net.

Congratulations—Kentucky Utilities elects William H. Skinner and Floyd I. Fairman vice presidents. Company also elects A. A. Tuttle, secretary and treasurer, a director . . . Euclid Electric & Manufacturing promotes R. G. Schrock from vice president to executive vice president . . . GE names following general managers of eight of its operating divisions vice presidents: J. M. Crawford, F. E. Fairman, Cramer W. LaPierre, Clarence H. Linder, Harold A. MacKinnon, Charles K. Rieger, Glenn B. Warren, and William C. Wichman . . . Ford, Bacon & Davis promotes C. J. Abbott to senior vice president and elects C. R. Sample and C. S. Petrasch Jr vice presidents . . . Hubbard & Co names James H. Knowles president, succeeding Joseph V. Smith who becomes chairman of board and chairman of executive committee. John W. Carpenter, chairman of Texas P&L, receives gold wrist watch from his fellow associates for completing "50 years of faithful service to electrical industry."

Obituary—Clarence L. Law, 67, retired vice president of Consolidated Edison Co of New York, died Dec. 25.

THE ELECTRICAL WEEK

CONTINUED

USBR is asking new Congress to authorize four large power projects in Upper Colorado Basin (See also story on page 21) . . . NPA has amended its regulations to permit controlled materials to be delivered to utilities in the quarter following allotment of these materials. Amendment applies only to materials to be used for major plant additions and to allotments made for fourth quarter of 1952 and subsequent quarters . . . For year ended last June 30, TVA power sales reached 20 billion kwhr, 22% more than previous fiscal year. Total operating revenues were $95 million, compared with $70 million for preceding year.

Dispatching staffs of Boston Edison, New England Electric System, Cambridge Electric Light, and New Bedford Gas & Edison Light met recently at Framingham, Mass., to establish closer contacts in power exchange activities normally conducted by telephone.

From Canada—Seven-man committee is appointed in Victoria, British Columbia, to "get as much information as possible" about Libby Dam-Columbia Basin problem. Premier W. A. C. Bennett says government is "anxious to know our resources and our future needs before we give anything to U. S." . . . International Joint Commission is meeting in Montreal in February to discuss plans for $125-million St. John River hydro project in New Brunswick.

After merger of Rockland Gas into Rockland L&P, Charles L. Hulsit, president of Rockland Gas for past 15 years, becomes vice president and director of Rockland L&P . . . Electric Institute of Boston, Inc, elects Arthur W. Coombs, Simplex Wire & Cable, president for 1953.

IN THE INDUSTRY

The semi-annual electric power surveys by Edison Electric Institute, which through the past five years have contributed so much valuable information to the industry in this country, are being copied abroad. In 1950 a similar system for gathering and publishing data was set up in the countries of western Europe by the Organization for European Economic Cooperation in Paris. Now the Japanese have organized the Japan Electric Power Survey Committee. It will have as its chairman, Yasuke Anzo, chairman of the board of Tokyo Electric Power Co. Its surveys will be as of April 1 and Oct. 1.

Cisler Consulted . . . The move to set up such a committee was initiated by the Japanese government which discussed the matter with Joseph M. Dodge, president of the Detroit Bank and a financial adviser to Japan. Walker L. Cisler, president of Detroit Edison and chairman of the Edison Electric Institute Power Survey Committee, was drawn into the discussions. The result was the decision to form the Japanese committee.

EEI was asked to recommend two Americans who might come to Japan to assist in setting up a survey procedure. In response EEI recommended F. Douglas Campbell, Detroit Edison, and Leroy L. Hinckley, Pacific Gas & Electric Co.

The work started in September, and the first report as of Oct. 1 has been issued. It resembles closely the EEI report from which it was copied even to the section on the manufacture of electrical equipment.

Japs Should Escape Chaos . . . Now the Japs should be in a position to work their way out of the chaos in which they have been struggling. Since May 1951 electric power has been supplied by nine privately owned companies. Prior to that time there was a single generation and transmission agency and nine separate distribution agencies. Since the end of the war power requirements have been soaring. Financing has been the stumbling block to capacity expansion. The manufacturers are able to produce relatively large quantities of heavy electrical equipment. The result has been power rationing and restrictive rates to discourage use of electricity.

But the biggest handicap in getting the Japanese systems on their feet was lack of information. If the new power survey committee can supply this, it may speed recovery.

TECHNICAL NOTES

ARCHER E. KNOWLTON

Ground wire is hardly worth duplicating for a single line; a second would probably eliminate only one outage in each 700.

High temperature is largely what contributes high efficiency to the gas turbine cycle. High temperature, however, contributes to the operating difficulties arising from ash deposited in the blading.

Protection for series capacitor must safeguard it against excessive line current (fault conditions) and restore it to service the instant the fault is removed.

Reheat cycle is here to stay because it offers 5% gain in thermal efficiency, less feed pump power (15-18%), smaller condenser (7%), smaller boiler (15-18%), less fuel-handling and burning equipment (5%).

Voltage at which corona begins in extruded polyethylene is largely determined by gas dissolved in the extruded product, particularly if extruded at 200 C or higher.

Standardization of transformer bushing lengths must recognize (1) sufficient length below the flange to satisfy differences in oil level and (2) sufficient above the flange to satisfy variations in altitude and atmospheric contamination.

Capacitor saturation is being approached on only a few distribution systems. Half saturation is a representative status.

Auxiliary power has proven to be only 4.7 to 4.8% of gross generation in a reheat plant. Comparable non-reheat machines on the same system take from 5.5 to 6%.

Natural gas recently provided only 12.6% of the nation's fuel needs but this figure is now nearly 20%; annual consumption is over 5 trillion cubic feet.

Industry Achievements of 1952

Investor-owned companies are combining to handle projects too big for one alone. Atomic energy is attracting more electric utilities. Capacity, generation, and sales set records

BAYARD L. ENGLAND, President, Edison Electric Institute

BAYARD L. ENGLAND

A significant development of 1952 in the power industry was the organization of Ohio Valley Electric Corp by 15 companies to build two steam plants with a total capacity of 2.2-million kw to supply the Atomic Energy Commission. This organization follows the pattern established two years earlier by the five-company Electric Energy, Inc, which is installing 900,000 kw in southern Illinois near Paducah, Ky., also to supply power to the federal government.

A similar pattern of cooperative action in a major undertaking is the proposal of five New York State power companies to carry out, if Congress grants permission, the redevelopment of Niagara Falls.

Private Capital Willing . . . These examples nullify the claim often made that private capital is unable or unwilling to undertake large-scale power developments and that the federal government must build them.

Another development of long-range importance to the industry has been the study of the technical and economic problems of the conversion of atomic energy into electric power by five groups of companies under agreement with AEC.

The withholding by Congress of appropriations for many unnecessary duplicating transmission lines and other power facilities proposed by government bureaus was another significant industry development of 1952.

Power Enough . . . An adequate supply of power was available in all sections throughout 1952 with two exceptions. In the Pacific Northwest drought was experienced late in the year. There Bonneville Power Administration operates under a "calculated risk" policy whereby it contracts to sell power to large industries beyond the firm generating capacity of its hydro plants in dry years, a policy which contemplates the risk of periodic power shortages. In the Tennessee Valley area drought also resulted in some interruption of power to industrial customers holding interruptible power contracts.

Gross margin between generating capability and peak power demand in 1952 for the country as a whole was the same as a year ago, about 12%. Shortage of critical materials, held back the construction program and is expected to continue to affect adversely construction progress in 1953 and 1954. Schedules which called for an addition of 9 million kw of capacity in 1952 experienced a slippage of nearly 3 million kw. The construction program for the entire industry for 1953 calls for the addition of 12 million kw with the investor-owned companies scheduling about 9 million of this.

Peak Up 7% . . . The growth in December peak demand was about 7% compared with a growth of 9% in 1951, and in 1950 of 14% over 1949.

Total installed capability at the end of 1952 was approximately 84.5 million kw. The margin between peak demand and generating capability was about 9 million kw.

Construction expenditures of investor-owned companies in 1952 totaled $2.5 billion. Budgeted expenditures were $2,650,000,000. The construction budget for 1953 is $2,850,000,000.

To finance 1952's building program, electric companies during the year drew on such internal sources as depreciation reserves and surplus accruals for $800 million and sold securities totaling some $1.7 billion. Making up the securites total were $1.1 billion in long-term debt, $400 million in common stock, and $200 million in preferred stock.

Energy generation by the industry increased 27 billion kwhr over 1951 to attain a record of about 400 billion kwhr. With addition of some 63 billion kwhr generated by industrial and railway plants for their own use, total U. S. production in 1952 was about 463 billion kwhr.

More Customers . . . Over 1.5 million new customers came on electric lines during 1952, bringing the total to about 48.5 million. This increase represents an expected leveling-off from the phenomenal rate of growth, averaging better than 2 million customers a year, experienced since World War II. Because more than 97% of all occupied urban and rural homes are now being served, future customer additions will largely reflect the formation of new households.

Electricity use continued its accelerating advance in the home during 1952, with the average annual consumption per residential customer rising to 2,175 kwhr. up by more than 170 kwhr. Average revenue per residential kilowatt-hour reached a new low of 2.76¢.

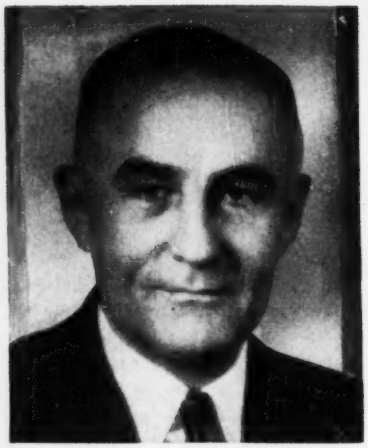
Helping to lessen the heavy impact of increasing costs is the reduction in coal required to produce a kilowatt-hour of electricity. Coal consumption in 1952 amounted to 1.1 lb per kwhr, 3.9% lower than in 1951.

Electricity sales for the industry have nearly doubled in the past six years, attaining a new high of 343 billion kwhr in 1952. Despite the steel strike, total sales were 7.8% over the 1951 record, with industrial sales 6.1% higher, commercial sales 8.5% greater, and residential sales 13% more.

Total revenues of the investor-owned electric companies reached $5.4 billion in 1952, up 8.8% over the record high of 1951. But expenses, including taxes and labor, increased.

THOMAS G. DIGNAN

HUDSON R. SEARING



LEWIS M. SMITH

Looking Forward to a Better 1953

Executives of electric companies serving key cities of the nation anticipate continued growth of their systems despite the high level of activity and many advances made in past year

THOMAS G. DIGNAN, President, Boston Edison Co

During 1952 general business conditions were very satisfactory in the Metropolitan Boston area served by Boston Edison Co. Employment and payrolls were at high levels. There are no local reasons why these general conditions should not continue into 1953. The consumption of electricity in our area in 1952 increased nearly 8% over 1951. We anticipate that this trend will continue at approximately the same rate in 1953.

Our estimated peak load for 1953 in the Edison territory will approximate 683,000 kw. Our available capacity will be ample to meet our territorial requirements and inter-system contractual commitments. The largest increase in our revenues in 1952 came from residential customers, further demonstrating the favorable balance which exists among residential, commercial, and industrial customers.

Since the close of World War II, Boston Edison has added 262,500 kw of generating capacity, an increase of 57%. The most recent unit, with a name-plate rating of 81,250 kw, went into service last August. Under construction is another 81,250-kw unit, to be in service for the 1954 peak. In the period 1946-1952 the company's capital expenditures were nearly $96 million. In 1953 they will be in excess of $20 million, and in the five-year period 1953-1957 our planning calls for plant expansion of approximately $104 million.

There have been significant changes in industrial conditions in Metropolitan Boston and in other parts of New England since World War II. In textiles, the largest and one of the oldest of New England's industries, there has been a steady decline in number of jobs, but a recent survey of the Federal Reserve Bank of Boston indicates that loss of jobs in textiles has been largely offset by increases in employment in such industries as electronics, machinery and metal-working, and in the non-manufacturing field.

The engineering talent available from the educational institutions in Metropolitan Boston has created a world center of research which will be of great significance to the young and rapidly growing electronics industry of New England. Boston Edison's customers in the field of electronics increased their use of electricity 34% from 1951 to 1952, and further increases of a substantial nature are anticipated for 1953. Already the electronics industry is the sixth largest of major classifications among Boston Edison industrial customers, and by the end of 1953 it may exceed the classification of textiles and clothing, now ranking fifth.

The electric light and power industry of the entire New England area is optimistic toward the future of this six-state region. Since 1946 the industry has added substantially more than $500 million to plant investment. A few months ago the Electric Coordinating Council of New England, an association made up of electric utility officials, announced that with the present rate of growth an additional $2.5 billions will be spent in new plant by 1975.

HUDSON R. SEARING, President, Consolidated Edison Co, New York, N. Y.

The diversified nature of New York City's commerce and industry and the large percentage of residential customers tend to limit Consolidated Edison's rate of load growth.

We expect general business conditions to level off in 1953, and we expect our load to keep increasing during the year but at a reduced rate compared with the 1952 rise. The boost in consumption will come, as in the past, from existing rather than new customers and will be due to such factors as wider use of air conditioning and longer hours of TV set operation.

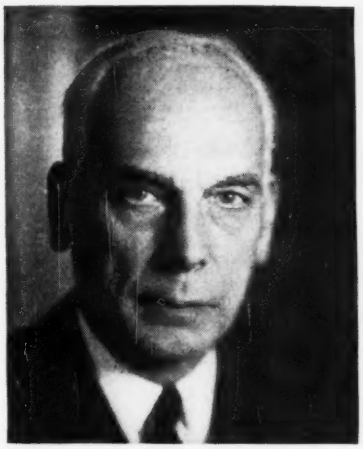
Our electrical construction budget for 1953 will probably be somewhat below the $91 million spent in 1952.

We have experienced some slippage in equipment deliveries during the year, enough to postpone until 1953 about $10 million of expenditures originally scheduled for 1952.

If there is any slippage during 1953, our capacity margin at the time of the winter peak will be lower than our normal objective; and maintenance during the year will be a problem. The anticipated increase in summer air cooling load will increase the severity of this maintenance problem.

Our current financial requirements for construction are being met through an open end credit with a group of local banks. If during 1953 the market is favorable, we may fund a part of this loan.

We will continue in 1953 our present promotion policy, joining with manufacturers, distributors, and dealers in plans to further those appliances which we find from time to time have not gained general consumer acceptance.



CHARLES Y. FREEMAN

W. W. LYNCH

LEWIS M. SMITH, President, Alabama Power Co, Birmingham

Alabama and the Southeast have experienced a phenomenal industrial expansion in the past ten years. The number of new industries in the service area of Alabama Power Co is increasing, on the average, at a rate 50% higher than that of the nation as a whole. Prospects are very favorable for a continuation of the progress now being made.

Production of electricity is always an important indication of the industrial pace and general advancement and prosperity of an area. In 1940 Alabama Power sold 1.7 billion kwhr in its service area; ten years later volume was 2½ times as great.

Further indication of area growth is customer growth of 237,000 since 1940, a gain of 158%. In December 1952, Birmingham Electric was merged with Alabama Power adding some 117,000 customers, and bringing the total to 506,000. We anticipate a growth of 10% during the next three years.

Territorial sales during 1952 will reach 4.9 billion kwhr, 7.5% over 1951. By 1955 we anticipate sales of 6.6 billion kwhr, nearly four times the 1940 volume. Domestic use per customer per year is now approximately 2,400 kwhr and is expected to reach 2,800 kwhr by 1955. Territorial peak load in 1940 was 392,000 kw. In 1952, it reached 1,028,000 kw, up 162%. In 1955, we expect a load of 1,343,000 kw, nearly 3½ times that of 1940.

Increasing growth and consequent increase in demands for power call for additional generating, transmission, and distribution facilities. During 1952 the seventh unit (100,000 kw) was installed at Gorgas steam plant. This brought Gorgas capacity to 390,000 kw and made it the largest investor-owned steam generating center in the Southeast. One 55,000-kw hydro unit was installed at Martin Dam, giving it a total capacity of 154,000 kw.

It is expected that the first 125,000-kw unit at Barry steam plant near Mobile will be placed in operation late in 1953 and a second unit in 1954. Early in 1953 ground will be broken at Gorgas for a 150,000-kw unit, which is scheduled for completion in 1955.

Upon completion of the present program, total capacity of Alabama Power will be 1,530,000 kw, of which 68% will be in steam plants. This total is nearly twice that of 1940.

During 1952, our construction program will exceed $33 million, and for the next three years we expect to add facilities costing in excess of $100 million.

CHARLES Y. FREEMAN, Chairman, Commonwealth Edison Co, Chicago, Ill.

The sustained economic growth of the Chicago and Northern Illinois area served by the Commonwealth Edison System has resulted in a persistent and continuing increase in electricity load and output through 1952. Our construction program for the next four years anticipates growing demand.

In 1952 our sales are expected to exceed by at least 3% the previous record total of 13,847,165,000 kwhr in 1951. Our 1952 peak load is expected to be only slightly below our present system capacity of 3,062,000 kw as we have not yet been able to establish a normal reserve.

The system-wide construction program in which we are now engaged involves practically all categories of utility plant, including gas distribution facilities. During the past seven years we have spent $600 million on plant facilities, and during the next four years we plan to spend about $500 million more.

The program includes the installation of 1,434,000 kw of electric generating capacity. To date, six units totaling 774,000 kw have been placed in service. We now have under construction, in various stages of completion, five units totaling 660,000 kw.

The proposed additions to electric production plant during the 1953-1956 period will cost about $200 million. An even larger amount, $240 million, is scheduled for electric transmission lines and distribution facilities. About $60 million is planned for gas facilities and other plant in the four year period.

Of the $500 million required for plant construction in the 1953-1956 period, it is expected that $280 million will be provided through the sale of securities in those years. While it is too early to suggest the nature of our 1953 financing, our past policies afford us a large measure of flexibility as to our future financing steps.

(CONTINUED ON NEXT PAGE)

W. W. LYNCH, President, Texas Power & Light Co, Dallas

The Texas Power & Light Co's construction budget for 1953 will approximate that of 1952. The sales budget is approximately 25% higher, reflecting increased new business activities. Equipment deliveries, while behind schedule in some instances, appear to be satisfactory to meet load increases if no further slippages occur. The financing for 1953 will be in the form of senior debt and common stock equity.

General business conditions in the area have been affected, at least from the standpoint of agriculture, by adverse weather conditions, but it appears this is beginning to be offset by a strong trend towards increased industrialization.

J. E. LOISEAU, President, Public Service Co of Colorado, Denver

All indicators point to a continued high level of activities in the area served by the company. Plans and estimates contemplate a growth in 1953 comparable with immediate past years. Television came to the area in 1952; so some additional per customer consumption of electricity should be reflected in 1953 from this source.

The company and subsidiaries will begin 1953 with approved construction totaling $49,500,000 of which $42,200,000 is for electric facilities. It is expected that $22,300,000 will be spent in 1953, of which approximately $15,100,000 will be for electric expansion. Expenditure for electric production equipment will require $7,700,000, transmission $2,000,000, and distribution $5,400,000.

Production facilities include the installation of a 66,000-kw unit at Zuni Station in Denver and a 10,000-kw unit at Alamosa Station. Upon completion of these in the latter part of 1953 or early 1954, the company and subsidiaries will have 468,000 kw of generating capacity, an increase of 138% since the end of the war. Work will start during the year on the installation of a 100,000-kw unit now expected to be in operation in 1955.

The construction program of the company for 1952 was about $5 million short of original expectations because of slow deliveries of equipment and supplies involving steel which have resulted in delays in the installation of some major facilities. The slippage in

J. E. LOISEAU

JAMES H. POLHEMUS

the installation of the 66,000-kw Zuni unit can have an important effect on our expected reserves at the time of our 1953 peak. If this unit can be put in operation in time for the peak, our reserves will be approximately 24%. Without it they may be as low as 8%.

In the field of commercial activities, the company expects to continue its intensive load building program in all departments but with particular emphasis on home lighting. During the immediate past years, this emphasis has been placed on street and school lighting. Adequate home lighting, offering the greatest potentialities, has always been the most difficult to develop. Specific plans have been completed for intensive work in this field.

Cash available for construction purposes at the beginning of the year together with cash from internal sources will provide about 65% of the funds necessary to carry on the $22,300,000 construction program. The remainder will be raised through the sale of securities, the type of which has not as yet been determined.

JAMES H. POLHEMUS, President, Portland General Electric Co

Situated in one of the fastest growing regions of the country and dealing with a service for which there is an ever growing demand, electric utilities of the Pacific Northwest are bound to grow and expand accordingly.

Portland General Electric Co, for example, has increased the size of its utility plant by 70% since the end of 1945, bringing the total plant value to around $100 million. This increase is especially significant inasmuch as most of the new construction has consisted of enlargement of the transmission and distribution system of the company, rather than expenditures for new generation.

The growth factor continues to be important in PGE's plans for 1953, with a new construction budget which calls tentatively for an expenditure of around $8 million. If the fish-power controversy over PGE's proposal to build the 120,000-kw Pelton project on the Deschutes river is settled during the year, the construction figure will be increased substantially to get the project under way.

There have been significant developments in recent weeks which indicate that 1953 will see further steps taken toward harmony and mutual cooperation between federal and state administrative agencies and the industry itself in converting the Columbia basin's great hydroelectric potential into a reality. In Douglas McKay, former governor of Oregon, the Department of the Interior will have a secretary whose intimate knowledge of the region, its problems, and its resources will afford personal leadership to that end. Then, too, the recent proposal made by Dr Paul Raver, Bonneville Power Administration administrator, that the federal government plants and grid be turned over to an interstate commission, with responsibility for future development, parallels in principle various plans which have evolved from the study and experience of more than a decade.

Perhaps no one of these plans is acceptable in its entirety, but taken together, with the combined thinking which lies behind them, they may lead to new and greater progress in development of the region.

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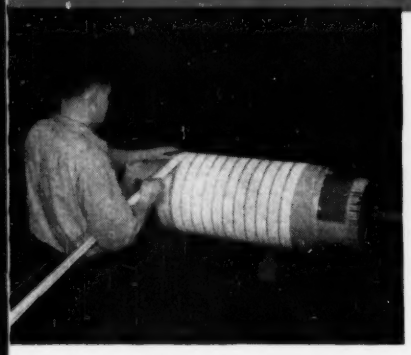
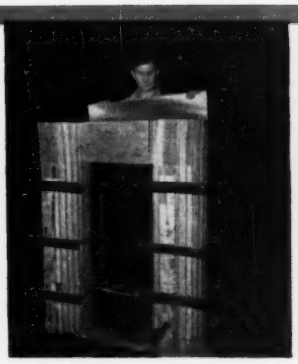
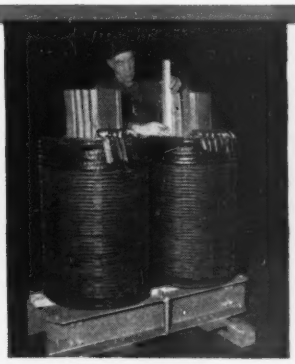


1. The coils of Kuhlman power transformers are usually wound concentrically. Coils that are to carry heavy currents at low voltage are of the interleaved disc type. Above, a cylindrical LV core for a 1000 KVA transformer being wound with multiple wires transposed when necessary to maintain low stray losses.



2. Assembling the core for a 1000 KVA transformer. After the assembler has finished inserting the laminations, the core will be inverted to receive the coils. The laminations are made of cold-rolled oriented silicon steel which permits the flux path to follow the grain of the steel producing high permeability and low hysteresis.

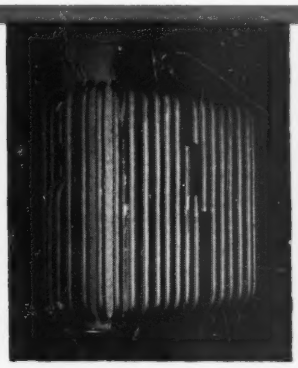


3. Here the core has been inverted and assembled to the lower part of the core clamp. The coils, which have been immersed in a thermo-setting varnish and baked, have been slipped over the legs of the core. The assembler is bracing the core to prevent shifting and vibration.

4. After the core has been braced, the assembler inserts the necessary laminations on top to complete the core. After this, the remainder of the core clamp will be assembled and the core and coil assembly will be ready to be lowered into the tank.

5. The tank is made of heavy steel plate, electrically welded at the seams. Here you see the cooling tubes being welded on the outside of a tank to provide oil-tight and rust-proof joints.

6. In this picture, the welded joints of the cooling tubes are being tested for leaks. After these tubes are put on the tank, the entire tank is filled with kerosene and subjected to air pressure as a final check to determine if the tank is completely oil-tight.



7. Finally, the entire tank is shot-blasted and painted with a coat of rust-inhibitive primer and two coats of corrosion resistant paint. The tanks are then ready to receive the core and coil assembly.

8. Kuhlman transformers are engineered for long life and dependability. They are built from carefully selected materials according to sound principles of design and assembled with infinite care and patience by skilled craftsmen with years of experience at their job. Then each transformer is thoroughly inspected and tested for safe, efficient performance. When you install your next transformer, specify Kuhlman for transformers of outstanding quality—backed by nearly 60 years of electrical manufacturing experience. Write us today for the name of your nearest Kuhlman representative.

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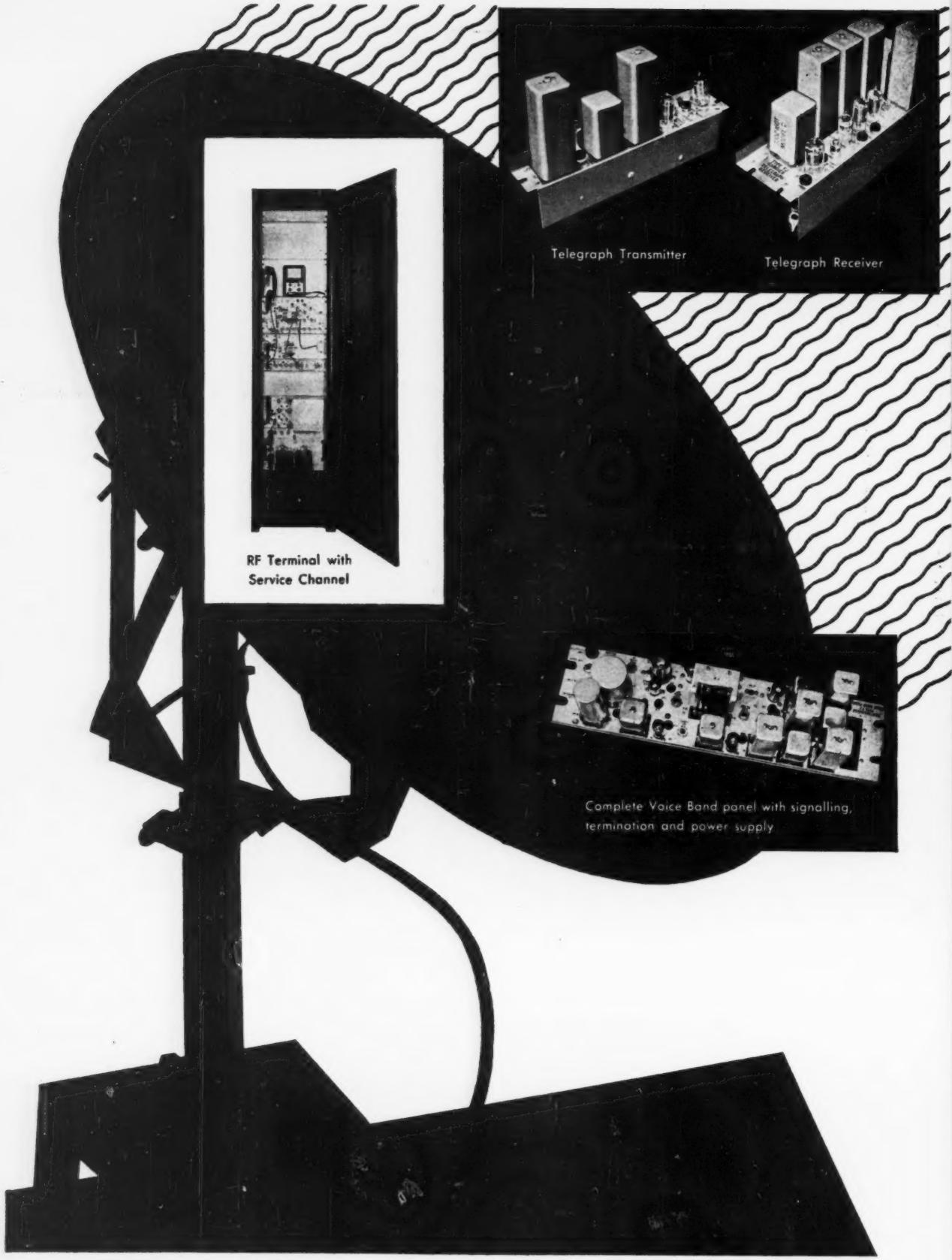
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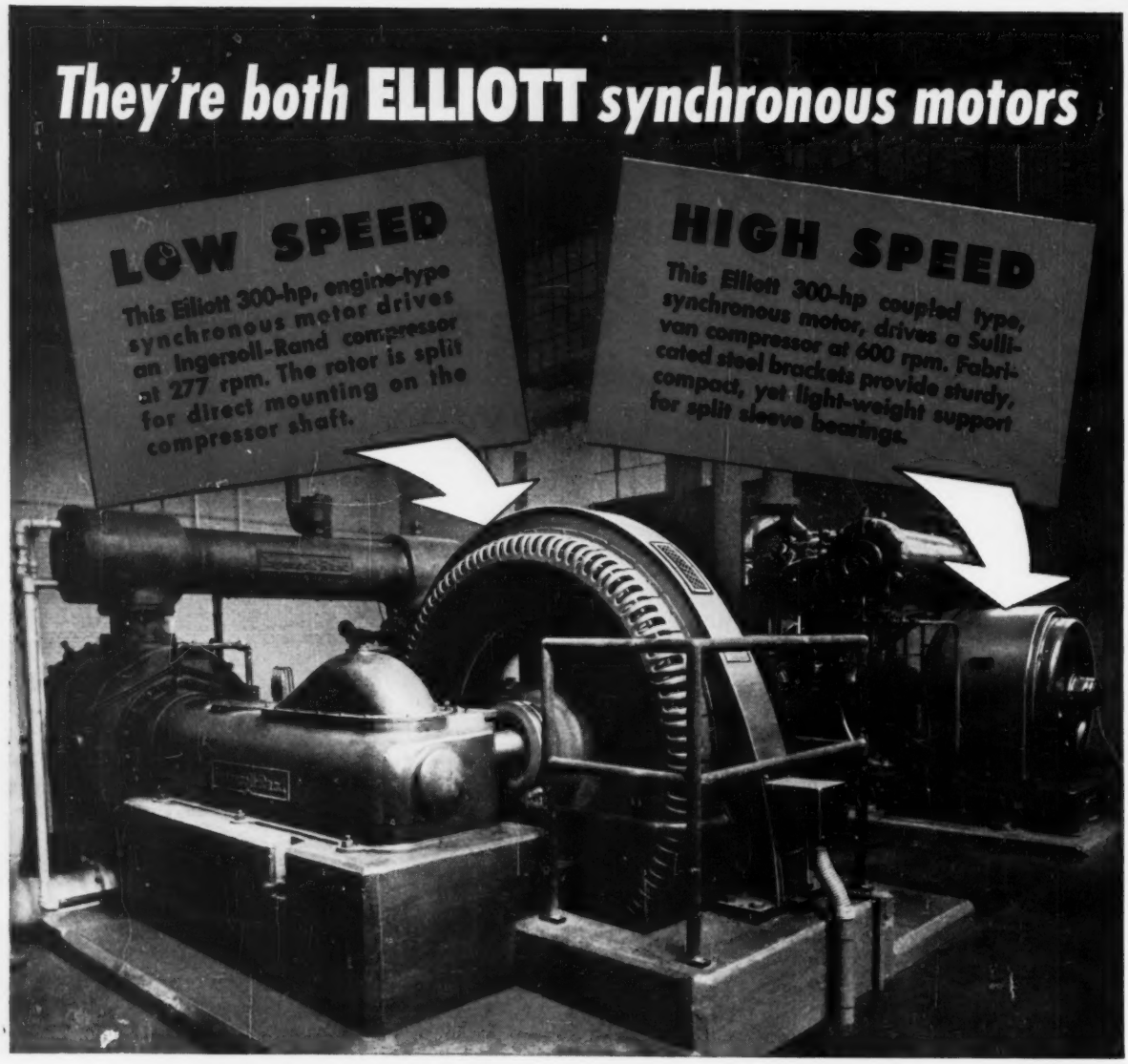
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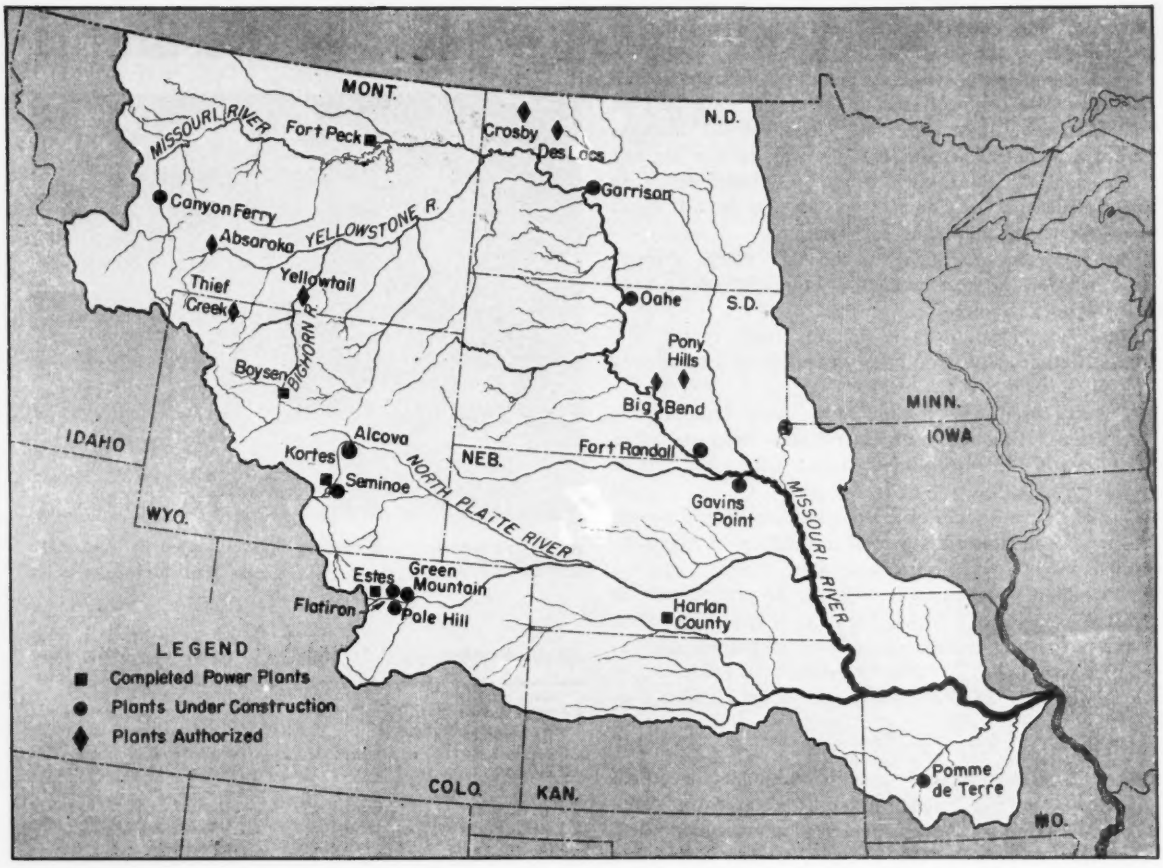


BASIN AREA MAP shows status of major power projects. All completed work is indicated except seven USBR units totaling 27,000 kw

The Missouri: No Waltz for Ike

Basin development may provide new Administration's first brush with multi-purpose river projects. Headaches are: defining overall attitude on federal projects; resolving differences among the various agencies; coordinating construction and operation

Among the problems President-elect Eisenhower will inherit from the Truman Administration is the whole complicated Missouri River Basin development program.

Plans for the area are being administered by a loosely-knit inter-agency group representing several federal agencies and the ten states concerned. Construction on a wide scale is under way, but a coordinated program for building and operating the many power, flood control, and irrigation projects has never been put into effect.

Even participants in the present group admit some stronger organization is needed. Early last month governors and other representatives from the states which participate in present planning sessions got together to work up an interstate compact as their solution.

President Doubtful . . . President Truman, who bosses federal agencies participating in inter-agency work, is plainly not satisfied. He appointed a Missouri River Survey Commission last spring to study the situation and make recommendations.

Report of this commission is due shortly. It is expected to recommend a more efficient organization to carry out basin-wide strategy. The group was supposed to develop an engineering plan for the future, but time limitation has prevented that.

The report probably will outline a method of administering the construction and operation program in the Basin. These are the alternatives from which the commission will choose:

- Continuation of the present inter-agency group.
- Creation of an interstate compact organization to work in partnership with the federal government.
- Creation of a natural resources division in the Department of Interior to administer federal development and operation.

A fourth alternative would be creation of a Missouri

Valley Authority along lines of the Tennessee Valley Authority. But an MVA has been long discounted as unacceptable to the people in the area.

From campaign statements made by Eisenhower, it seems the state compact idea might appeal most to him. This alternative may also suit Gov Douglas McKay, Secretary of Interior-designate. He will have a big say in the final decision, since Bureau of Reclamation in his department is playing a major role in present Basin development and marketing of power.

This approach, too, might suit the Army Corps of Engineers, which has been successful in getting along with local interests.

But whatever approach is finally chosen by the new Administration, plenty of construction plans are already available.

A recent report by the Missouri Basin Inter-Agency Committee and the Missouri River States Committee gives a fair idea of the work already accomplished and that in the blueprint stage.

One of the backbones of the operation is electric power. Presently contemplated is a total installation of about 3,350,000 kw of hydroelectric generating capacity, producing 13 billion kwhr annually. So far 41 plants, with an installed capacity of 2,673,710 kw, have been authorized. However, existing facilities and others in process of construction total only 1,277,850 kw. Plans calls for adding at a later date 495,000 kw to three Corps units under construction.

Private Facilities Needed . . . To supply electrical needs of 8 million people in the 529,000 sq mi area will require that private companies supply another 30 to 35 million kwhr by 1970, Federal Power Commission officials have predicted.

About 10% of total private and public output will be used up by the basin's 3-million farm population. In the past decade and a half, number of farms electrified has risen from 8% to 80%, and usage has jumped from 1,000 kwhr to 2,400 kwhr annually. It is expected to be between 4,200 to 6,000 kwhr by 1970, according to Inter-Agency estimates.

Another large chunk of power will be absorbed by plants processing the area's crops and livestock into food products, and residential use is expected to jump from 1,600 kwhr in 1950 to 3,500-5,000 kwhr in 1970.

According to the report, total power requirements, including reserve allowance, will be 6,611,000 kw in 1960 and 9,442,000 kw by 1970. Allowing for retirement, plants operating in 1950 will have a capacity of 2,717,000 kw in 1970. To meet 1970 requirements an additional 6,725,000 kw will be needed from public and private sources.

A substantial part of private development will be needed in lower Basin states because most federal authorizations have been for plants located in the upstream part of the Basin. For the downstream section, the report states, new power demands will have to be supplied largely by additional fuel-electric capacity on existing public and private systems, although a part may come from hydroelectric plants "not yet fully investigated."

Slow Start . . . When the Missouri Basin Inter-Agency Committee, composed of representatives from the Departments of Interior, Agriculture, and Commerce, Corps of Engineers, FPC, and Public Health Service, was established in April, 1945, six federal hydroplants with a total capacity of 80,800 kw were in operation. Since then eight more plants with a capacity of 161,500 kw have been completed—three in Wyoming totalling 56,000 kw; two in Colorado with 53,100 kw; Fort Peck Dam in Montana with 50,000 kw; a 1,200 kw plant in Nebraska and another in South Dakota.

Initial firm power from the first of large dams (Garrison and Randall) being built by the Corps of Engineers, when supplemented by power from Fort Peck, is expected to be about 570,000 kw by 1956. It will be marketed in North and South Dakota and other areas within economical transmission distances.

Draft contracts have been sent to many customers in the area and negotiations have been completed with several REA-financed cooperatives and six private utilities for use of their transmission lines.

Here Is the Status

ENGINEERS rush with work on Garrison Project on Missouri R. in N. Dakota (above) and others listed below as . . .

Project	State	River	Kw Capacity
Completed or Under Construction			
Fort Peck	Montana	Missouri	165,000
Garrison	N. Dakota	Missouri	400,000
Oahe	S. Dakota	Missouri	425,000
Fort Randall	S. Dakota	Missouri	320,000
Gavins Point	Nebraska	Missouri	100,000
Harlan County	Nebraska	Republican	1,200
			1,411,200
Authorized			
Big Bend	S. Dakota	Missouri	120,000
Pomme de Terre	Missouri	Pomme de Terre	10,560
			130,560
Planned			
Richland	Missouri	Gasconade	25,000
Rich Fountain	Missouri	Gasconade	35,000
Stockton	Missouri	Sac	7,000
			67,000

of the Missouri Basin Power Projects:

RECLAMATION works on power plant at Alcova Dam on N. Platte R. (above) and these other projects:

Project	State	Stream	Kw Capacity
Completed or Under Construction			
Canyon Ferry	Montana	Missouri	50,000
Angostura	S. Dakota	Cheyenne	1,200
Heart Mountain	Wyoming	Shoshone	5,000
Shoshone	Wyoming	Shoshone	5,600
Boysen	Wyoming	Big Horn	15,000
Pilot Butte	Wyoming	Wind	1,600
Guernsey	Wyoming	North Platte	4,800
Lingle	Wyoming	North Platte	1,400
Seminoe	Wyoming	North Platte	32,400
Kortes	Wyoming	North Platte	36,000
Alcova	Wyoming	North Platte	36,000
Estes	Colorado	Colorado R. Div.	45,000
Mary's Lake	Colorado	Colorado R. Div.	8,100
Flatiron	Colorado	Colorado R. Div.	69,700
Pole Hill	Colorado	Colorado R. Div.	33,250
Green Mountain	Colorado	Blue	21,600
			366,650
Authorized			
Kenil	Montana	Marias R. Canal	1,600
Lyon	Montana	Madison	24,000
Absaroka	Montana	Yellowstone	50,000
Little Porcupine	Montana	Missouri	18,000
Portage	Montana	Missouri	20,000
Tiber	Montana	Marias	2,000
Yellowtail	Montana	Big Horn	200,000
Moorhead	Montana	Powder	8,000
Crosby	N. Dakota	Missouri Div.	48,000
Des Lacs	N. Dakota	Missouri Div.	60,000
Pony Hills	S. Dakota	Missouri Div.	180,000
Sunlight	Wyoming	Sunlight Creek	20,000
Bald Ridge	Wyoming	Clarks Fork	30,000
Hunter Mountain	Wyoming	Clarks Fork	12,000
Thief Creek	Wyoming	Clarks Fork	60,000
Tongue River	Wyoming	Tongue	25,000
Big Thompson	Colorado	Colorado R. Div.	6,700
			765,300
Planned			
Crossons	Colorado	Blue	26,000
Grant	Colorado	Blue	20,000
Insmont	Colorado	Blue	14,200
Narrows	Colorado	South Platte	8,000
Resort Creek	Colorado	Blue	52,000
Singleton	Colorado	Blue	19,000
Shawnee	Colorado	Blue	11,400
Turks Head	Colorado	Blue	7,200
Two Forks	Colorado	Blue	116,000
Lower Canyon	Montana	Yellowstone	80,000
Yankee Jim	Montana	Yellowstone	50,000
Ash Creek	Nebraska	Dismal R. Div.	1,980
Austin	Nebraska	Middle Loup	1,900
Bison	Nebraska	Buffalo Creek	3,600
Cushing	Nebraska	North Loup	5,960
Davis Creek 2	Nebraska	North Loup	11,000
Davis Creek 1	Nebraska	North Loup	2,600
Georgetown	Nebraska	Dismal R. Div.	1,900
Lee's Park	Nebraska	Middle Loup	6,140
Lillian	Nebraska	Middle Loup	4,360
Maple Creek	Nebraska	Platte R. Div.	5,330
Nickerson	Nebraska	Platte R. Div.	5,570
Plum Creek	Nebraska	Plum Creek	24,000
Riverdale	Nebraska	Wood	6,800
Freemont Canyon	Wyoming	North Platte	48,000
Glendo	Wyoming	North Platte	24,000
Niobrara R. Projects	Nebraska	Niobrara	47,220
			604,160

Plans call for the plants to be interconnected by a transmission grid into an integrated system. Consisting principally of 230-kv and 115-kv lines, it was well under way by 1951, with construction correlated to existing private and public power district systems.

FPC Aids in Planning . . . Primary responsibility for planning, design, and construction of dams and power plants rests with the Bureau of Reclamation and the Corps of Engineers. These agencies are aided by the FPC, which acts as consultant on power development plans and potential requirements.

Thus far the Corps has had much greater success in getting its projects under way. It has started work on six of its eight authorized operations. Exceptions are the 120,000 kw Big Bend plant in South Dakota and Pomme de Terre in Missouri. It has completed installation of 85,000 kw for the Fort Peck plant, and the 1,200 kw Harlan County plant in Nebraska. Four other plants (Garrison, Oahe, Fort Randall, and Gavins Point) with an ultimate total capacity of 1,245,000 are under construction.

On the drawing boards is another 80,000 kw installation at Fort Peck and three projects in Missouri totalling 67,000 kw.

USBR, on the other hand, has completed only a third of its 33 authorized projects, with a total capacity of 156,100 kw. Under construction are five other plants totalling 210,550 kw. Authorizations have been received for 20 more plants with a total capacity of 765,300 kw, while 27 others with 604,160 kw capacity remain unauthorized.

What luck the Bureau and Corps have in completing their plans will depend in large part on the stand the incoming administration takes on government-sponsored developments.

Materials Ease Up for Utilities

Power firms, electrical equipment manufacturers will get most of scarce metals needed in first six months of '53

Electric utilities and electrical equipment manufacturers will get most of the controlled materials they will need during the first and second quarters of this year.

That is the consensus of Washington mobilizers who are overseeing the electric power expansion program. By the end of the second quarter, some mobilizers say, supply of the basic metals will nearly balance the controlled demand. But few of them venture to predict controls will be eliminated by the middle of this year.

Provision for Power . . . In announcing allotments for the first two quarters of this year, Defense Production Administration said they would meet direct defense requirements in full and "give maximum support to the defense important electric power and aviation gas programs."

Adequate provision has been made, DPA said, for all segments of the power expansion program—especially those items having a long lead time.

This does not mean there will be no material problems during the next six months. While there appears to be adequate allotments of steel, plate and stainless are still hard to purchase. There may be trouble all along the line in cashing the allotment tickets for steel just as during much of '52.

Depa "Not Displeased" . . . Defense Electric Power Administration, claimant agency for utilities, was reportedly "not displeased" with its first and second quarter allotments, although its total steel quota for the first quarter is some 55,000 tons less than the amount alloted in the third quarter of last year. Depa's allotments for the first half of this year shape up something like this:

	First Quarter Requested	First Quarter Allotted	Second Quarter Requested	Second Quarter Allotted
Carbon Steel (tons)	334,000	285,000	289,798	217,500
Alloy Steel (tons)	4,847	4,847	3,673	3,673
Stainless (000 lb)	175	175	150	150
Brass Mill (000 lb)	6,630	5,750	7,528	6,747
Wire Mill (000 lb)	62,948	59,000	61,660	55,000
Foundry Products (000 lb)	230	230	285	285
Aluminum (000 lb)	48,523	48,523	52,732	50,000

Steel Picture . . . The steel picture is similar for the two National Production Authority divisions which allot materials to the equipment manufacturers—Engine and Turbine Division and Electrical Equipment Division. While both must absorb a cutback in allotments for the first quarter, it is contemplated that the heavy electrical equipment manufacturers will get most of the steel allotments requested. Boiler manufacturers are plagued by the plate shortage and hydro turbine makers are reporting trouble in getting the copper they need.

Supply of copper and aluminum available to utilities and manufacturers has ceased to be the problem it was early last year. An Engine and Turbine Division spokesman reported allotments will be sufficient to "get by" during the first two quarters of this year, but said the situation is still tight.

Duke Power to Construct 230-Kv Line This Year

Duke Power Co this year will build the first 230-kv transmission line in the Southeast. The double circuit transmission line will run 75 miles from Duke's River Bend Plant, Mt. Holly, N. C., to the Greenville, S. C., area.

The new high voltage line will serve to integrate the Greenville area with generating capacity in North Carolina. Increasing demand for power has outstripped the company's South Carolina facilities.

The new line is expected to provide data for future construction. The company may consider construction of generating plants in the coal fields if the trend in freight rates continues. Transporting power, the company said, is much cheaper than transporting coal over the railroads at present high freight rates.

In addition to building the new line, Duke plans to add 516,000 kw of new capacity in the next two years. The utility plans to have at least a 10% minimum reserve of power capacity. This reserve is swelled somewhat by hydro plants which give some flexibility to system operations.

Index Is Available

Electrical World's semi-annual index for July-December 1952 has been prepared and copies are now available upon request. They may be obtained without charge. Address requests to Electrical World, Editorial Office, 330 W. 42nd St., New York 36, N. Y.

BPA Sets Marks

Records in generation, sales, and net revenues were set in fiscal year ending June 1952

Bonneville Power Administration continued to sell and deliver an increasing share of electric energy consumed in the Pacific Northwest during the fiscal year 1952, achieved new record generation, sales, and net revenues and set up a decentralized management and advisory council program.

The 15th annual report noted BPA supplied 61.2% of total energy generated by major utilities of the region or almost 18.6 billion kwhr, of which 5.1 billion kwhr went to other utlities.

Nameplate Ratings Topped . . . Bonneville Administrator Paul J. Raver noted excellent water conditions for the fiscal year ending June 30, 1952 helped permit BPA to again boost output over the nameplate ratings of the Columbia River federal system. Gross revenues of $40,180,144 were at a new record, up 11%, over the previous year. Net revenues were $15,890,642, a gain of 9.6% over 1951.

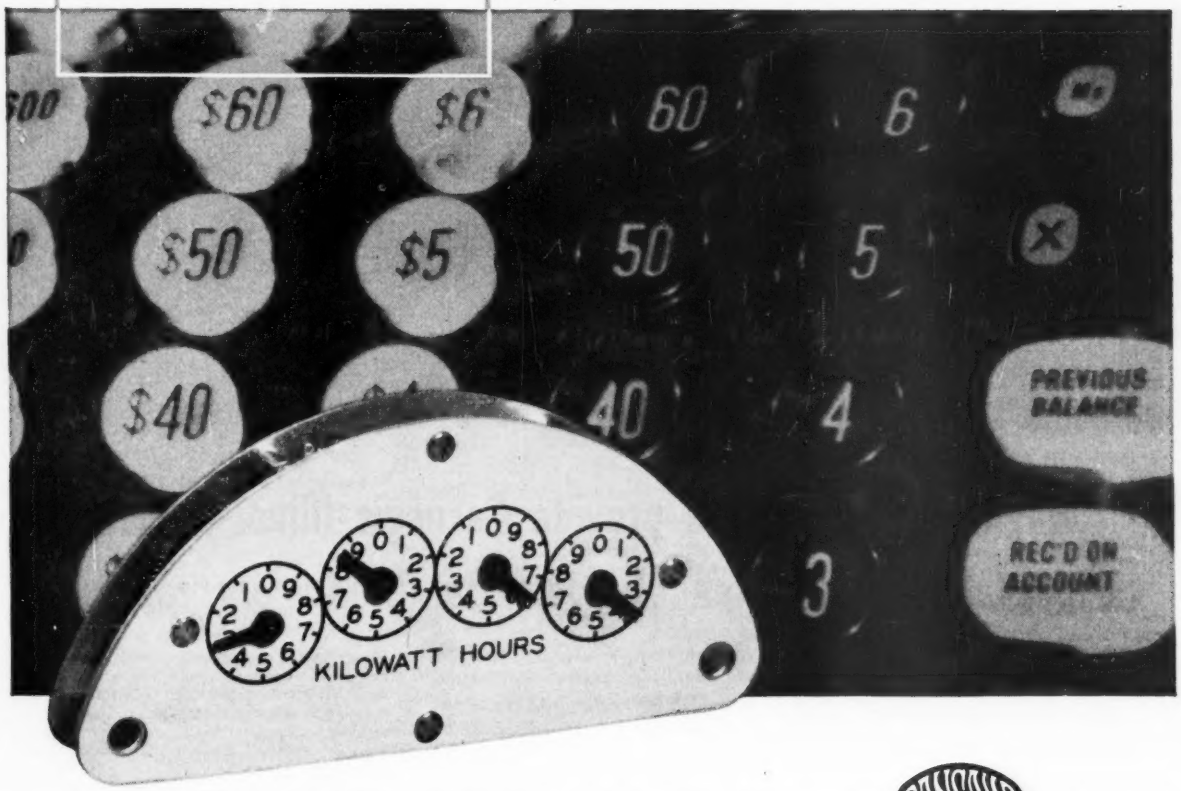
Power generation at Bonneville and Grand Coulee power plants represented a 13% increase over the previous year.

A new system peak, recorded Dec. 31, 1951, of 2,784,000 kw was compared with the previous record of 2,535,000 kw in June, 1951.

Revenues from sales to 16 industries were 44.86% of the total. Aluminum plants took 33.29%; others, principally electro-chemical and metallurgical processing plants, 11.57%. Sales to public utilities represented 32.29% of revenues; to private utilities 21.22%. Other operating revenues added 1.63% for the total.

a full measure of profit

Sangamo J Meters



To assure a full measure of profit, Meter Department Executives agree that a *modern* meter must sustain its accuracy for extremely long periods . . . should require minimum maintenance . . . and must provide ample capacity for future loads.

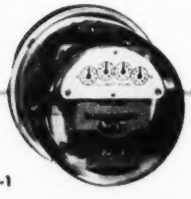
Sangamo Meters go far beyond these requirements. For example, as a part of Sangamo's continuous program of improvement, new corrosion-resistant finishes have been applied to Type J Meters. These finishes give greater protection from the effect of corrosive atmospheres and greatly prolong meter life under conditions of extreme exposure.

As new technologies develop, they will be used by Sangamo to still further increase the dependability and long life accuracy that the Utility Industry has a right to expect from the watthour meters they buy.

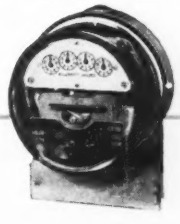
For the complete story, get Sangamo Bulletin 201.

SANGAMO

SANGAMO
ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS



Only Measured Facts are Known Facts



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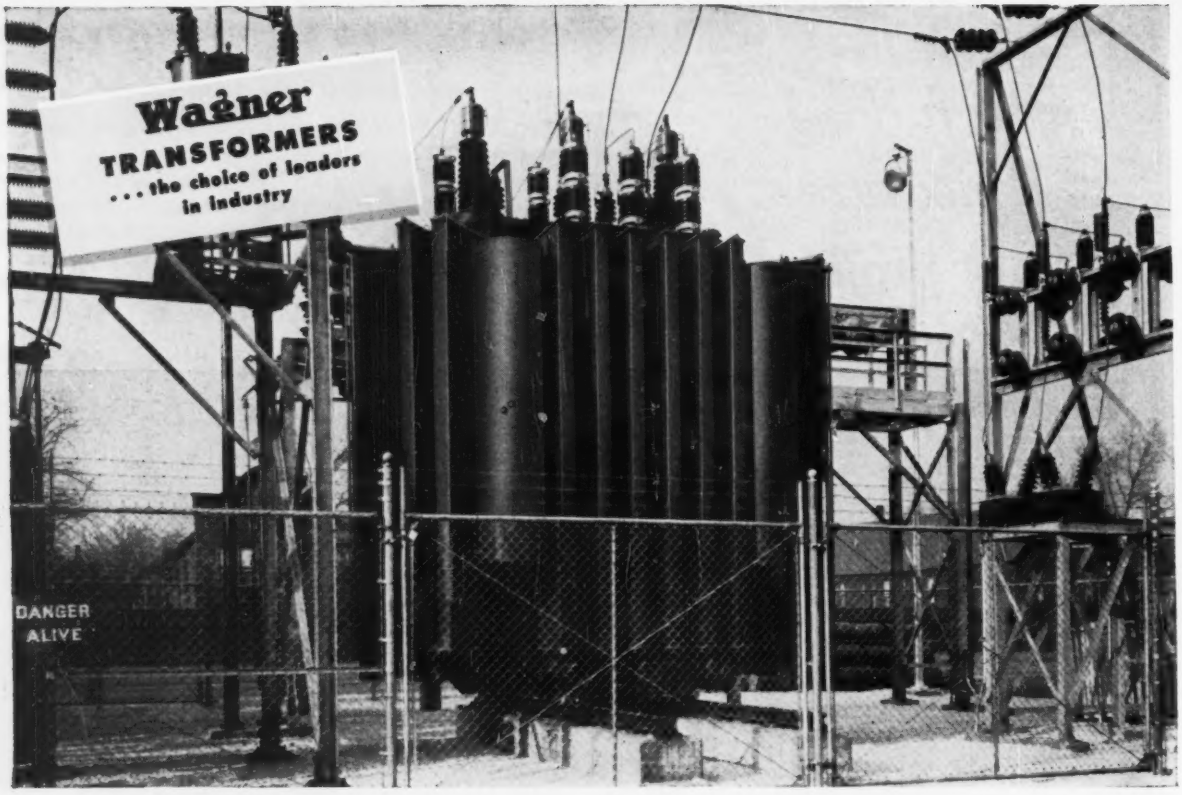


Wagner Transformers provide Carnegie-Illinois Steel dependable distribution of power to *"keep 'em rolling"*

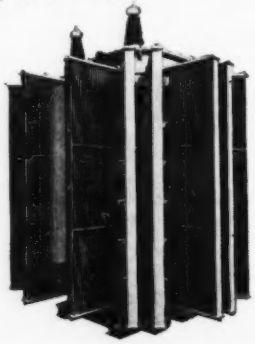
When you think of the Carnegie-Illinois Steel Corporation, you may have a mental picture of the greatness of American industry. It *is* great—a modern goliath of industrial production—rolling out the steel that is the sinew of all industry. And its greatness is in *production.*

Production is a word with which Wagner Transformers like to be associated. Hundreds and hundreds of Wagner power transformers, of all types and sizes are distributing power to industrial plants throughout the country. In every case they are adding to their reputation for complete dependability . . . for unfailing service . . . that prompted Carnegie-Illinois to install Wagner Transformers.

Wagner engineers are qualified to specify the correct transformer for *your* requirements. Consult the nearest of our 29 branch offices or write to

Wagner Electric Corporation
6456 Plymouth Ave., St. Louis 14, Mo., U. S. A.

Shown below is a Wagner 16,667 kva Power Transformer. Single phase, 60 cycle, 72,000 to 6,600 volts. This transformer was adapted to the special needs of the Carnegie-Illinois application. Wagner engineers can suit your special requirements as well.



Wagner Electric Corporation EST. 1891 WE

ELECTRIC MOTORS • TRANSFORMERS
INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS — AIR AND HYDRAULIC

WT50-1

Reclamation Asks $2.1 Billion

Retiring Commissioner Straus hands new Congress program calling for additional 25 million kw in next six years

Bureau of Reclamation today (Jan. 5) hands to the new Congress a $2.1 billion, six-year construction program which proposes installation of more than 2.5 million kw of capacity at multipurpose projects.

Admittedly the program could only be carried out under optimum conditions, but the departing Democrats leave it as a target for the incoming Republican Administration to shoot at. It appeared to be part of the Democratic strategy of making the Eisenhower Government compete with actions and plans of the Democrats. The Reclamation program is comparable in some ways to the Democratic Tennessee Valley Authority program announced in December (EW, Dec. 15, p 92).

This is the first such long-range program released by Reclamation since 1948 when a seven-year, $3.9-billion program was proposed. By comparison, the present program is modest.

For departing Reclamation Commissioner Michael Straus, the program is Stanza One of his swan song. It was submitted to Congress in response to a conveniently placed request of House Interior Committee Chairman John R. Murdock of Arizona.

Stanza Two for Straus is a long-range study of future power transmission for the West. This study suggests a 22-state, high tension grid linking systems of all major utilities west of the Mississippi. A 500-kv backbone line is proposed for the long distance transmission.

With 15 days still to go, Straus may have another plan or two to publicize before leaving office.

The new six-year program embraces approximately 300 projects or units of projects in the 17 Western states and calls for investigations of irrigation projects in three other states—Arkansas, Missouri, and Louisiana. Just how the program fares depends almost entirely upon the actions of the new Republican Administration and Congress.

A large number of the projects are already authorized or under construction. It would appear likely that orderly construction will continue on projects under way, but Congress will have to decide in what order the remainder are to be handled. This can be done by controlling appropriations for Reclamation work.

Particular emphasis is placed on the hydroelectric portions of the multipurpose water projects contained in the program. The bureau doubts that even this program will be adequate to meet power needs in the Western states.

Reclamation's Six-Year Program

Appropriations Required Millions of Dollars	Capacity to Be Installed Thousands of Kw	Annual Power Revenues Millions of Dollars
1953...220.0	352.5	51.0
1954...257.6	192.5	55.0
1955...346.1	211.5	64.0
1956...412.7	39.0	76.0
1957...357.0	554.4	85.0
1958...285.6	434.9	92.0
1959...231.8	1,081.7	93.0

At the end of the present fiscal year —June 30—Reclamation estimates approximately 4,369,927 kw of capacity will be installed at Reclamation projects. By the end of fiscal 1959 the capacity would total 7,236,427 kw if the program is carried out. It further estimates there is a potential of 43,616,000 kw of hydroelectric energy in the western streams. Annual power revenues would increase from $51 million to $93 million under the six-year program, Reclamation officials estimate.

While the bureau shies away from setting down any year-by-year schedule of new starts, it disclosed that such controversial projects as Hells Canyon on the Snake River in Idaho and Bridge Canyon which is part of the Central Arizona Plan would be requested during the first few years of the six-year period.

St. Lawrence Hearings Will Be Resumed Feb. 2

Federal Power Commission hearings on the St. Lawrence Power Project will be resumed Feb. 2. Decisions on the two pending applications are probable within a month or two after that date.

Power Authority of the State of New York is the leading contender for the FPC license to build and operate the $285-million project with an installed capacity of 940,000 kw. Because it is a public body and was first to file its application, it has priority in obtaining a federal license.

However, action on its application is delayed as FPC considers an application filed by a private corporation—Public Power & Water Corp of Trenton, N. J.

Hugo A. Spalinski, president of the private concern, spent the last two days of the recent hearings presenting evidence and undergoing cross-examination on his plan. The Feb. 2 hearing is set mainly to give other interested parties a chance to express their views on the proposal.

No substantial evidence has been presented as to the financial ability of the Trenton firm to undertake the huge hydroelectric project. FPC examiner Glenn R. Law, who is hearing evidence in the St. Lawrence case, said he would hear a motion to receive depositions as to the financial ability of the firm if such a motion were made prior to Dec. 29.

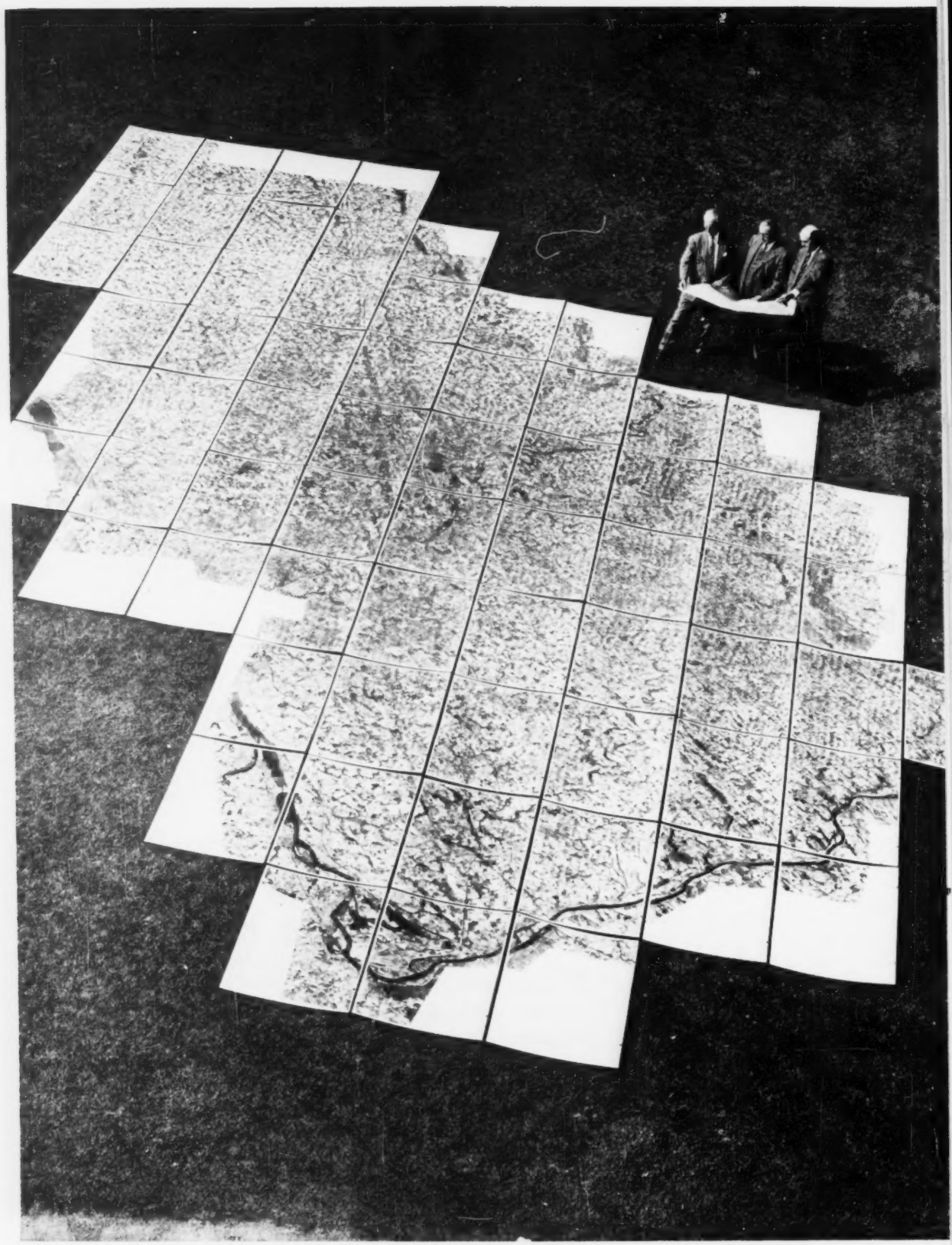
Failure of Spalinski to make a motion might change the future course of FPC proceedings in the case. If he does not offer depositions, it is possible a decision will be speeded on the N. Y. application.

Government of Canada, which is responsible for building the remaining portion of the proposed project on the St. Lawrence, has disapproved of the Spalinski application. At the conclusion of his testimony, counsel for the Canadian Department of Justice told the FPC examiner: "The course of the testimony has convinced us that this corporation would be unacceptable to us."

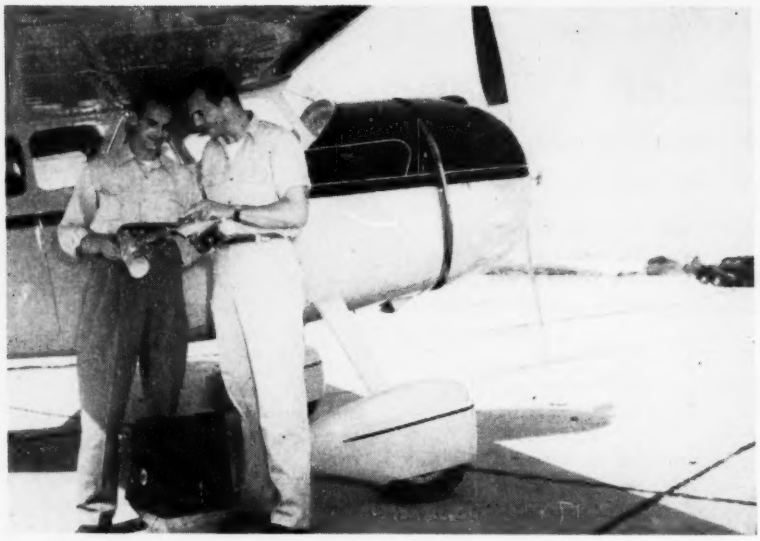
Canada Endorses NYPA . . . Application of the New York Power Authority has the unqualified endorsement of the Canadian Government and Ontario Hydroelectric Commission, which would actually build the Canadian portion of the project.

If and when a favorable decision is made on the New York application, it appears FPC's word would be final. Opponents of the project have not laid the groundwork for contesting such a decision in the courts. Neither the coal interests nor the National St. Lawrence Project Conference, opposed to its construction, produced witnesses to support their intervention in the FPC proceedings.

Without this preliminary, either of these parties would have a difficult task in convincing a court that their interest is sufficient to merit court review of a commission decision.



AERIAL PHOTO-MAP large enough to cover the side of an average 2-story house was used by Philadelphia Electric Co to make work maps for operations and planning. Map is composed of 66 sections each 34 x 52 inches. It covers a four-county, 2,340 sq mi area



1 Pilot and photographer check over day's flight plan before taking off on aerial photo-survey. They made 26 runs, taking 806 pictures at 10,000 ft and 120 mph

2 Aerial photos are corrected for tilt and related to ground positions

3 Corrected prints are assembled in mosaic to form photo-map sections. Sections are traced, tracings transferred to plastic sheets

4 Completed work map made from plastic master copy is checked against photo-map. Finished product is ready for use in the field

Utility Fly-Films Philadelphia

A 33x45-ft map of a company's service area is unhandy to use in the field, but Philadelphia Electric Co recently found it necessary to have one made. Reason: PE's service area has changed so rapidly the last few years that older territory maps didn't give complete information.

Best and most accurate way to get a new map was to photograph the 2,300 sq mi area from the air. The company engaged an aerial mapping service. Its pilot and photographer made 26 flights over the four-county territory, taking 806 pictures. They used roll film 180 ft long and 9 inches wide. Prints were pieced together in 66 sections, forming the huge aerial composite shown at left. Base drawings will be made on plastic sheets the same size as the photo-map sections. From these, finished maps that *can* be used in the field will be reproduced photographically at scales varying from 100 ft to the inch to 3,000 ft to the inch.

The project soon will be completed, making the company one of the best equipped — cartographically — in the country. . . . **Joseph Dragonetti**

NEWS ABOUT PEOPLE

Zworykin Wins Edison Medal

AIEE honors RCA executive for outstanding contribution to concept and design of electronic systems

DR V. K. ZWORYKIN

Dr V. K. Zworykin, vice president and technical consultant of the RCA Laboratories Division, Radio Corp of America, has been awarded the 1952 Edison Medal by the American Institute of Electrical Engineers.

The medal will be presented at the opening session of the five-day Winter General Meeting of the institute at the Hotel Statler, New York, Jan. 19. Zworykin was awarded the medal for outstanding contribution to the concept and design of electronic components and systems.

Received Lamme Medal . . . This honor is the latest of many won by Zworykin. His honors include the AIEE's Lamme Medal, the Morris Liebmann Memorial Prize of the Institute of Radio Engineers, Howard N. Potts Medal of Franklin Institute, and the Chevalier Cross of the French Legion of Honor.

A native of Russia, Zworykin has pioneered in electronic research ever since his undergraduate days before World War I at Petrograd Institute of Technology.

After coming to the United States in 1919, he evolved the basic principles of the iconoscope television pick-up tube and with a group of young engineers developed the tube to make it suitable for practical picture transmission. The iconoscope, which is used widely in television transmission today, has formed the basis for later developments such as the image orthicon and Vidicon television pick-up tubes.

He was also a leader in the development of the kinescope television picture tube.

RCA Research Director . . . Zworykin did research for Westinghouse Electric Corp from 1920 to 1929. When he joined RCA, he served as director of electronic research from 1929 to 1942; associate research director, RCA Laboratories, 1942-1945; director of electronic research, 1946; and since 1947 has filed the present post.

He is a fellow of the AIEE, American Physical Society, and the American Association for the Advancement of Science.

Quebec Hydro Electric Makes Personnel Changes

Quebec Hydro-Electric Commission has appointed three chief engineers and promoted other members of its executive personnel.

J. E. Leo Roy, formerly superintending engineer of the transmission and distribution section, has been named chief engineer of auxiliary services and Dale M. Farnham, formerly engineer, system planning and distribution engineering section, has been made chief engineer of the engineering design division. James H. Wheatley, general superintendent of the shops and garage department, becomes chief engineer of the shops and transportation department.

In other appointments Rene Gauthier was named to Roy's former post of superintending engineer of the transmission and distribution section and Maurice St. Jacques was made Gauthier's assistant.

Other promotions include Herbert W. Haberl, assistant chief engineer of the engineering design division; Fernand Dugal, assistant chief engineer of the shops and transportation department; J. Raymond Hango, system planning engineer; Archie Benjamin, distribution engineer; and Merle P. Gunning, assistant distribution engineer.

DR JOHN GRANGER

Granger Named Winner of Eta Kappa Nu Award

Dr John Van Nuys Granger, assistant chairman of the engineering department of Stanford (Calif.) Research Institute since 1951, has been named the "outstanding young electrical engineer of 1952" by the Eta Kappa Nu Association. The award will be presented at a dinner to be held Jan. 19 at Henry Hudson Hotel, New York.

Granger was honored for his noteworthy research on aircraft radio antennas, organization and direction of a large radiation systems laboratory, and unusual interest in cultural and professional activities.

Cited for honorable mention were two engineers. They are Gustav W. Staats, head of design of supercharged ventilation turbine generators for Allis-Chalmers Manufacturing Co, for his outstanding contributions to the design and construction of supercharged hydrogen cooled turbine generators and extraordinary participation in the life of his community, and Edward O. Johnson, a research engineer with RCA Laboratories, Princeton, N. J., for his notable contributions to the field of gaseous electronics, his invention of the plasmatron, and special interests in art and professional activities.

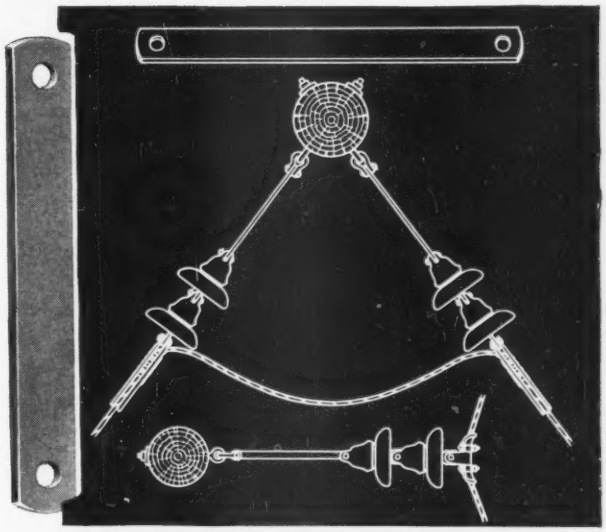
Stanford's Aircraft Radiation Systems Laboratory was organized by Granger. Since 1949 he has been responsible for the technical and administrative direction of the scientists employed by the laboratory. Granger, a graduate of Cornell College, Mt. Vernon, Iowa, received his master and doctor degrees from Harvard.

LINE CONSTRUCTION BLUEPRINTS

HOW SOME UTILITIES ARE MAKING CONSTRUCTION WORK EASIER . . .
IN WAYS THAT MAY BE HELPFUL AND USEFUL TO YOU.

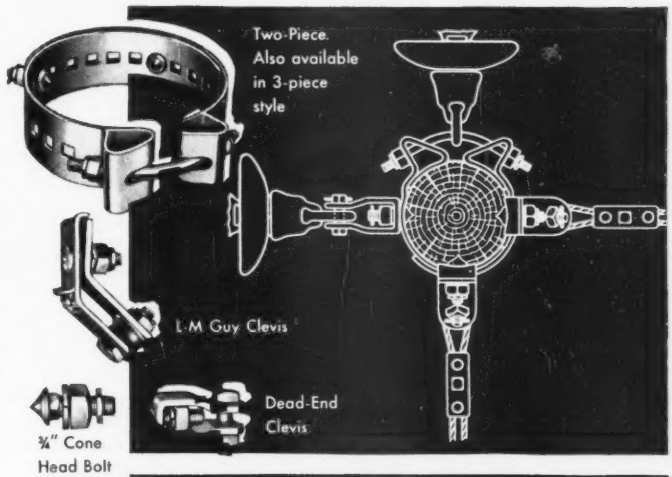
L-M EXTENSION LINKS

For safety reasons, more and more extension links are being used to obtain greater clearance from pole or crossarm to the insulators at primary dead ends. The links are attached to the wood member with an eye bolt and shackle. L-M extension links are available in a wide variety of sizes to meet any desired application.



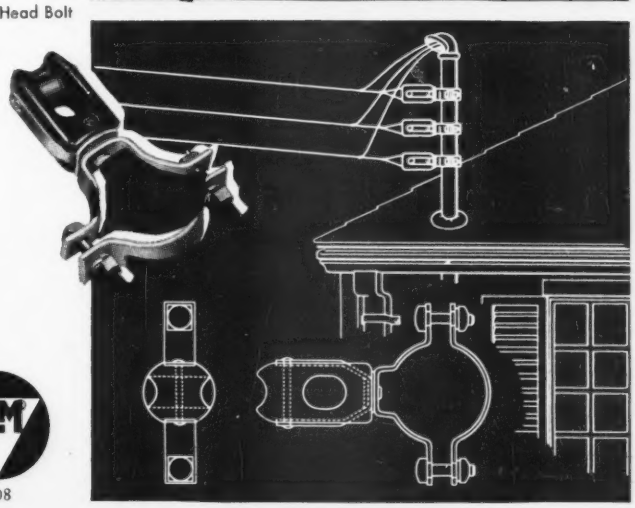
L-M POLE BAND and ATTACHMENTS

An improved galvanized steel (3/16″ x 3″) pole band for guying and dead ending. One of the advantages of this style band is that dead ends and guys may be attached at many different angles. Even under extreme load its strength does not depend on the strength of the welds. Two sizes, adjustable for 6 to 10 inch poles, and 8 to 15 inch poles. Choice of fittings. The ¾ inch curved bolt also can be used for attaching dead end fittings.



HANDY SERVICE ENTRANCE BRACKET FOR LOW-ROOF RANCH HOUSES

To assure required clearance for service drop wires on low ranch houses, the service entrance conduit frequently extends above the eaves of the roof. When 2″ or 2½″ conduit is used as a mast in this type of installation, this bracket provides a sturdy yet inexpensive method for dead ending the service drops. Catalog Number BPA43E1.



Do you have a line construction problem? These are just a few of thousands of L-M line construction specialties. If you have a line construction problem, let us know. We may have standard or special items in stock that will solve it. Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

LINE MATERIAL

Line Construction Materials

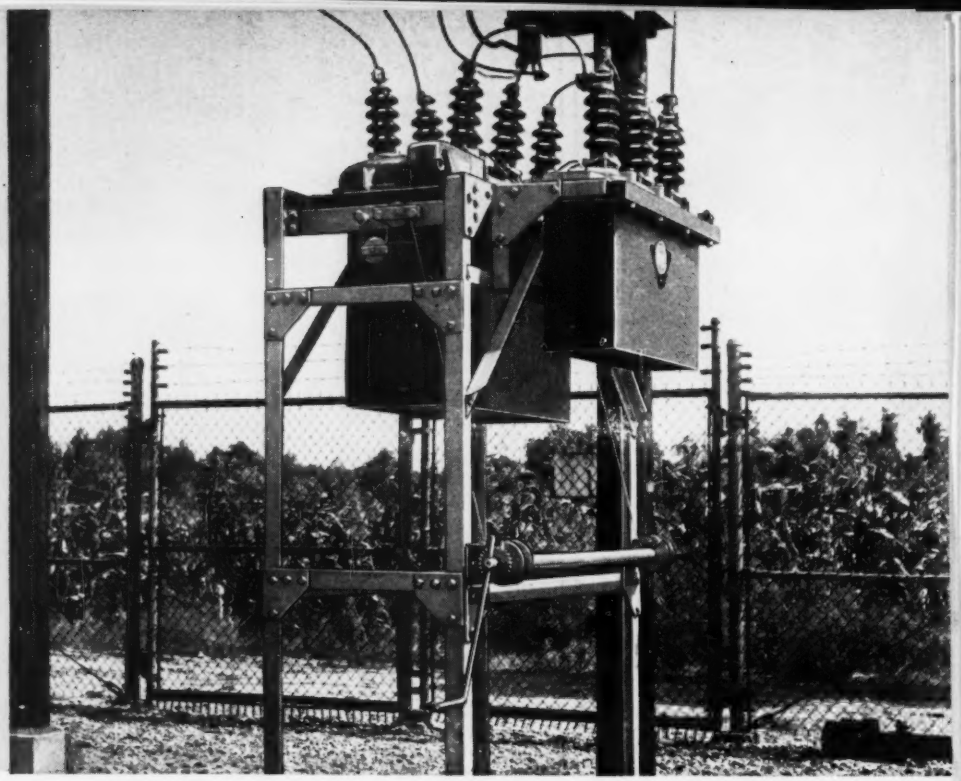
Complete Coordinated Equipment for Distribution Today

First 3-phase power-class recloser with 100,000 kva interrupting rating.

Completely self-contained unit provides automatic protection of substation feeders at less than half the cost of using substation breakers. Also used on feeder lines with heavy loads and high fault currents.

Available with ground trip solenoid and current transformer.

All three phases trip simultaneously when fault occurs on any one phase, preventing feedback.



The Kyle Type R Recloser at St. Joe substation of Indiana-Michigan Electric Company, Ft. Wayne. The recloser, termed the greatest recloser development since Kyle pioneered dual timing, is available with ground trip solenoid and the current transformer shown here.

Here is L-M's Kyle Type R 3-Phase Heavy-Duty Recloser

By R. C. KIRK,
Manager, Kyle Products Sales, Line Material Company

To meet the growing need for power-class protection on 3-phase lines, L-M engineers have developed a heavy-duty recloser that provides simultaneous tripping of all three phases on feeders with heavy loads and high fault currents.

This is a new and very desirable feature in heavy-duty 3-phase reclosers. It prevents high transient voltages sometimes encountered with single-phase switching on delta systems; and on wye systems it prevents feedback which might cause trouble on heavily loaded 3-phase circuits.

6000 Amperes Interrupting Rating

This recloser, known as the Kyle Type R, is a rugged, dependable unit capable of replacing breakers in substations with up to 100,000 kva fault capacity. The recloser is rated 25 to 280 amperes nominal load, trips at from 50 to 560 amperes, and interrupts up to 6000 amperes at 4.8 kv, or 4000 amperes at 14.4 kv.

Ground Fault Tripping

The Type R is available with a current transformer and ground trip solenoid that will trip the recloser at from 50 to 400 amperes.

This new Kyle Type R has been in continuous use in substation and pole line applications of several power companies for a period sufficient to substantiate design calculations and the extensive tests in the "Know House," L-M's short-circuit test laboratory.

Provides Dual Timing

Because it interrupts so much faster than breakers, the Type R permits co-ordination with fuses, eliminating unnecessary fuse blowing on temporary faults and thus substantially reducing service calls.

KYLE Type R Series Trip Coil Ratings

Nominal Load Rating Amperes	Minimum Tripping Current Amperes	Interrupting Rating* Symmetrical RMS Amperes at Maximum Phase-to-Phase Nominal Voltage of: 4.8 kv	14.4 kv
25	50	1500	1500
35	70	2100	2100
50	100	3000	3000
70	140	4200	4000
100	200	6000	4000
140	280	6000	4000
160	320	6000	4000
195	370	6000	4000
225	450	6000	4000
280	560	6000	4000

*Recloser interrupting ratings are based on the maximum test circuit X/R ratio of not less than 8, and the asymmetrical rating in total RMS amperes is 1.4 times the symmetrical ratings given in the table.

Closing Solenoid Voltage Ratings in complete range from 2.4 to 14.4 kv.

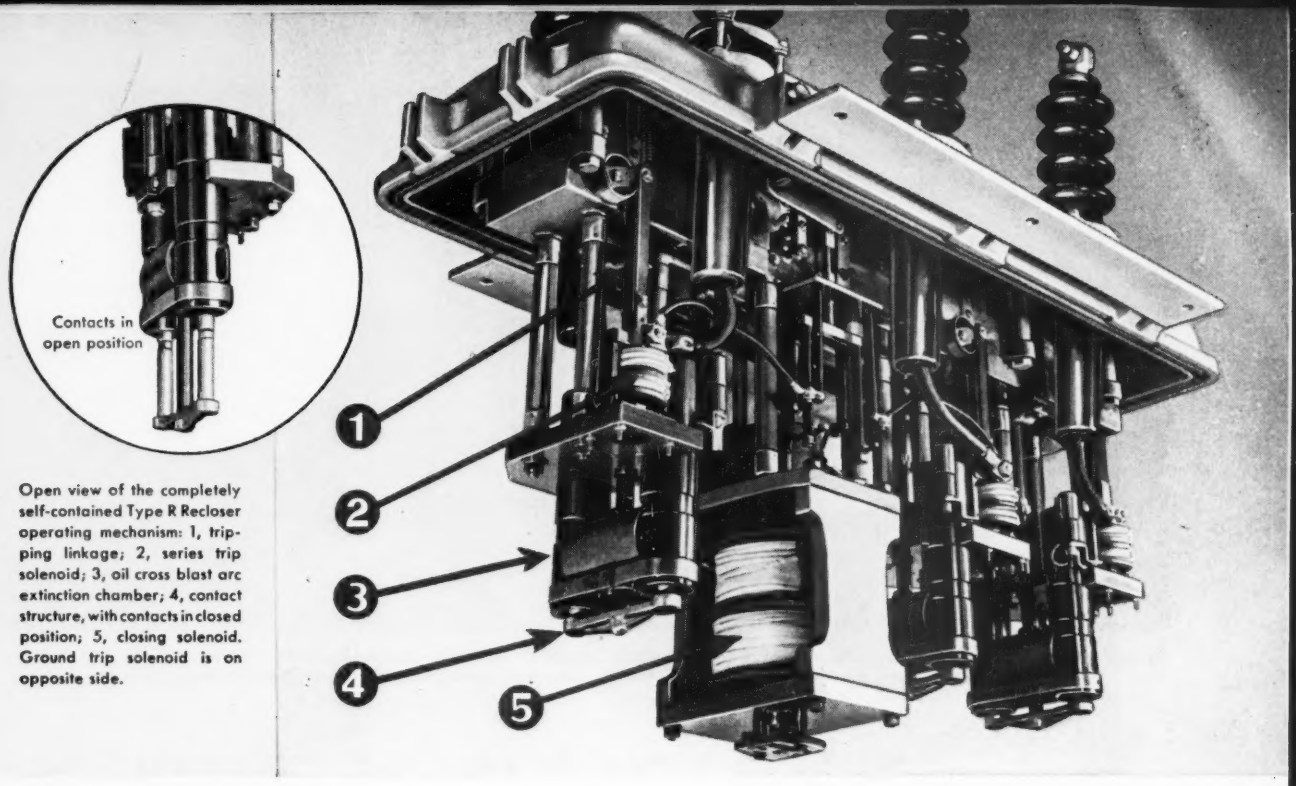
The 160 and 225 ampere ratings are available for special coordination problems. When either of these two ratings is used in series with other reclosers, minimum trip currents should have a ratio of not less than 1.32 for best coordination.

Ground Solenoid Settings: Minimum Pickup Current primary, amperes; 50; 67; 100; 133; 200; 400.

Three time-current curves; A, fast; B, retarded; C, extra-retarded. Available in any of seven sequences.

Trip coils, closing coil, and sequences easily changed in the field.

Insulation Level: full power class; meets ASA, NEMA, AIEE standards for 15 kv station equipment, as follows:
60 cycle one-minute withstand, dry: 50 kv.
60 cycle ten-second withstand, wet: 45 kv
1½ x 40 ms surge withstand (BIL): 110 kv



Open view of the completely self-contained Type R Recloser operating mechanism: 1, tripping linkage; 2, series trip solenoid; 3, oil cross blast arc extinction chamber; 4, contact structure, with contacts in closed position; 5, closing solenoid. Ground trip solenoid is on opposite side.

Applications for the Type R

Because of its operating advantages, the savings it affords in service calls, and its low cost in comparison with substation breaker equipment, this recloser will no doubt replace breakers in many cases. The low cost is possible because the Type R is a single, self-contained unit, designed, manufactured, and tested on a standardized basis, with all the economies this implies. It will also be used in many line locations where heavily loaded 3-phase feeders justify this protection.

Complete Automatic Protection

With this new unit, Line Material now offers a complete range of automatic protection, with both single-phase and 3-phase reclosers, in the entire range up to 6000 amperes interrupting rating at 4.8 kv, and 4000 amperes at 14.4 kv. Thus L-M now provides complete, coordinated automatic protection from substation to load.

DESIGN AND OPERATING FEATURES

Operation completely automatic. On permanent faults recloser opens and recloses three times, and then locks out. On temporary faults the fast openings permit the fault to clear; if it is not cleared, the time delay operation blows the sectionalizing fuse, and the recloser resets itself for another complete cycle. Type of fault—3-phase, single-phase, or phase-to-ground—does not affect the timing.

Time Delay System, located above oil level and is Silicone fluid filled.

Operating curves: A, fast; B, retarded; C, extra-retarded. Seven possible standard sequences or combinations. Sequences easily changed in the field.

Dual Contacts, with oil cross-blast arc extinction which has proved so successful on the Kyle Type L.

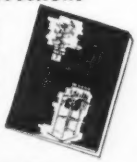
Clamp-on bushings, easily replaced; plated "Universal" terminals for both copper and aluminum, No. 6 solid to 250 MCM stranded conductor.

Kyle non-reclosing feature, for extra safety, standard equipment.

Operating handle, counter, and non-reclosing feature lever easily accessible under sleet hood. Trip-free operating handle.

Let Us Answer Your Questions

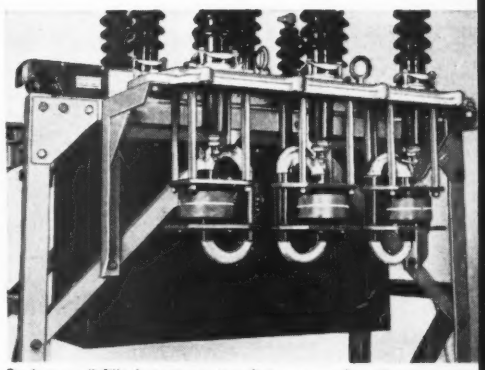
Ask the L-M Field Engineer for a copy of Bulletin CR1C —or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).



101

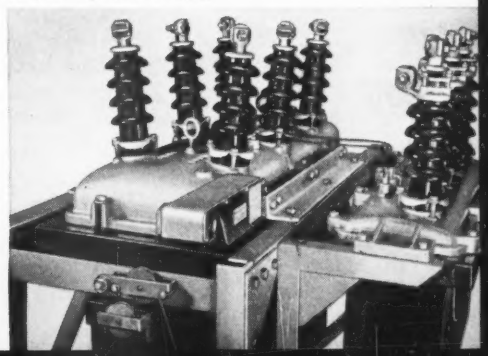
LINE MATERIAL
Kyle® Reclosers

COMPLETE COORDINATED AUTOMATIC PROTECTION FROM SUBSTATION TO LOAD



3-phase oil-filled current transformer, used with ground trip solenoid for ground fault tripping. Primaries are connected one in each phase through coaxial bushings, and secondaries are in parallel. If the three primaries have unbalanced currents, an unbalanced current will flow in the secondaries and energize the ground trip coil, which then operates the recloser in the same manner as the series trip coil.

Top view of Type R recloser connected to TR transformer at right, in substation mounting frame. Both transformer and recloser are filled with ORTO®, L-M's oxidation-resistant transformer oil. Oil filler plug with ¾" standard thread, located on top of tank, has dip-stick attached.



CARRIER CURRENT CONTROL provides remote supervision from Wissota Plant, 25 miles away. Rapid response rate increases plant's importance for peak load purposes; time from standstill to peak load is less than two minutes for one unit, less than five for all three units.

This 33,750 Kw Hydro Plant

Safe operation, quick response, reliable service, and some economy have been realized in the Holcombe hydro plant of Northern States Power Co, believed to be the largest remote-controlled hydroelectric installation in the United States.

H. E. RHOADES, General Superintendent, Electrical Plant Section, Northern States Power Co, Minneapolis, Minn.

Although completely equipped with instruments and controls for manual operation, Northern States Power Co's 33,750-kw Holcombe hydro plant has no operators assigned. Located on the Chippewa River in northwestern Wisconsin, the plant was designed by the Pioneer Service & Engineering Co, Chicago. Normal operation is by carrier current remote control, and supervision is from Wissota Plant, 25 miles away. Two men covering the eight-hour day-shift do routine maintenance, and they can and have operated the plant manually.

On the supervisory panel at Wissota, there are the following instruments: wattmeter, varmeter, 115-kv bus voltmeter, gate-position indicator, headwater level indicator, and a kilowatt-hour accumulator, together with the necessary select and operating push-buttons and lamps to give proper indications of the operations and alarms.

Started 25 Miles Away . . . When the operator at Wissota wishes to start a Holcombe generator, he selects the proper key, which in turn selects the equipment to be operated at Holcombe. When the supervisory lights at Wissota indicate that the Holcombe equipment is prepared to operate, the Wissota operator pushes a second button which then starts the Holcombe machine.

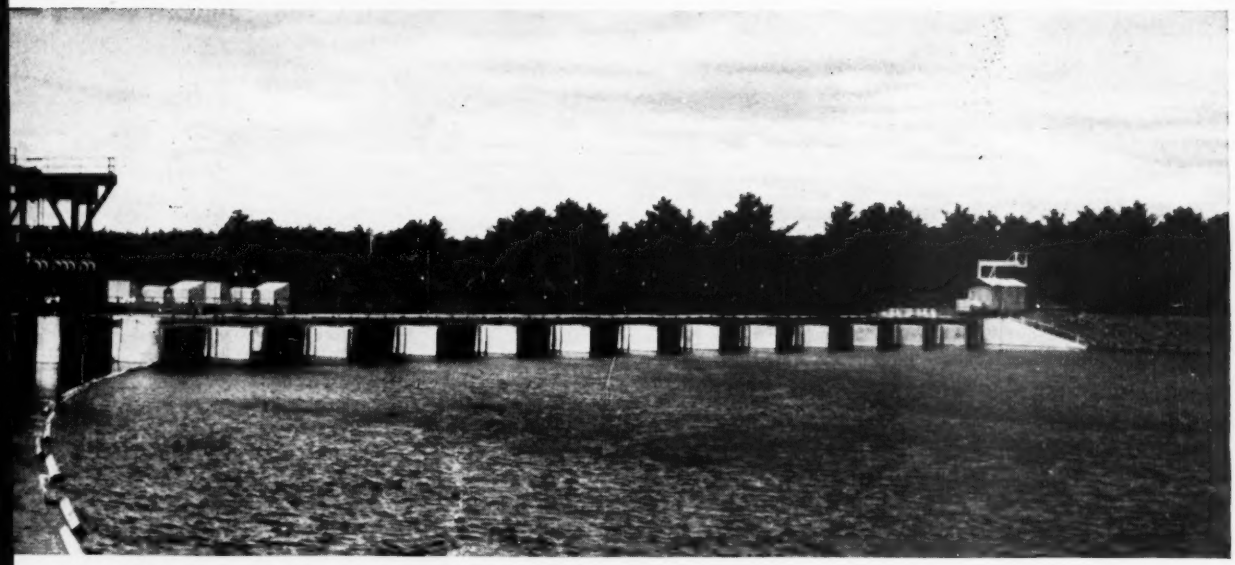
The Holcombe generator will start revolving if the following conditions are met:

1. 115-kv line breaker is closed and station auxiliary bus energized.
2. Station battery voltage is normal, and the various emergency and control circuits are energized.
3. All knockout relays are in the reset position.
4. Trash rack water differential detector is in the normal operating position.
5. Governor oil pressure is above 215 lb.
6. Generator under-speed switch is closed.
7. Exciter voltage is not above normal.
8. Generator breaker is open.
9. Generator field breaker is open.
10. Positioning cam switches on exciter field rheostat are in proper position.
11. Bearings are not above normal temperature.

With these conditions met, the master relay for the selected generator will close and energize the line starter for the preferred bearing water pump, if not already running, and for the selected generator turbine bearing oil pump.

It will also open the circuit to the generator brake solenoid, provide supervisory indication to Wissota, actuate and seal in a contactor short circuiting the exciter differential field, start an incomplete sequence timer, and prepare a circuit to another timer. The second timer starts when the field breaker closes and returns governor control to the remote station after governor "raise" limit switch opens.

When turbine guide bearing oil reaches a pressure of 35 psi, the operating circuit of the gate lock solenoid



Lake level is regulated by control, as well as normal power plant operations. Four gates nearest power house can be controlled from the supervisory panel at the Wissota Plant. During spring run off with eight gates open, discharge is 30,000 cfs.

Has No Operators

is energized; and the turbine gate locks are released permitting the governor to open the turbine gates slowly and build up speed on the unit. A third timing relay will shut down the unit if the thrust bearing cooling water pressure is not above 60 psi within a predetermined time.

When the generator approaches synchronous speed, a centrifugal switch on the permanent magnet generator closes at approximately 118 rpm, which in turn closes the generator breaker and places the unit on the line as an induction generator. Generator field is applied with the closing of the generator breaker through an auxiliary contact. With the closing of the field the generator pulls into step and automatically builds up to the load setting of the governor "raise" limit switch.

Other contacts on the generator breaker, which close when the breaker closes, start the kvar regulator, open the circuit to the field breaker trip coil, operate local indicating lights, give supervisory indication at Wissota of the generator breaker's position, start a total-time meter, open the circuit which returns the governor to no-load setting when the breaker trips, open the circuit which returns the field rheostat to no-load setting when the breaker trips, and prepare a circuit to trip the master relay if the turbine gates should close to no-load position with the generator breaker closed. Total time from start to full load is less than two minutes.

Shutdown by supervisory control is substantially the reverse of the startup sequence, with brakes applied when gates are fully closed and unit reaches half speed.

Upon completion of the chain of automatic sequential starting events, the Wissota operator can vary the load, if he so desires, between light load and the pre-set upper limit. He can also obtain telemetered indications of two spillway gates and total station kwhr generated since the kwhr accumulator was last actuated.

The pulse-type accumulator stores indications from all three generators and, when actuated, transfers the stored reading to a companion instrument at Wissota which is equipped with a cyclometer-type register. The Holcombe accumulator has a storage capacity equal to full load generation on three units for about 2½ hours.

Emergency Operation . . . Operation of generator differential relay, or of the generator neutral voltage relay, will immediately trip the generator and field breakers and cause load rejection, shutdown, and lockout of the unit. On lockout the unit cannot be restarted until lockout relays have been manually reset at Holcombe.

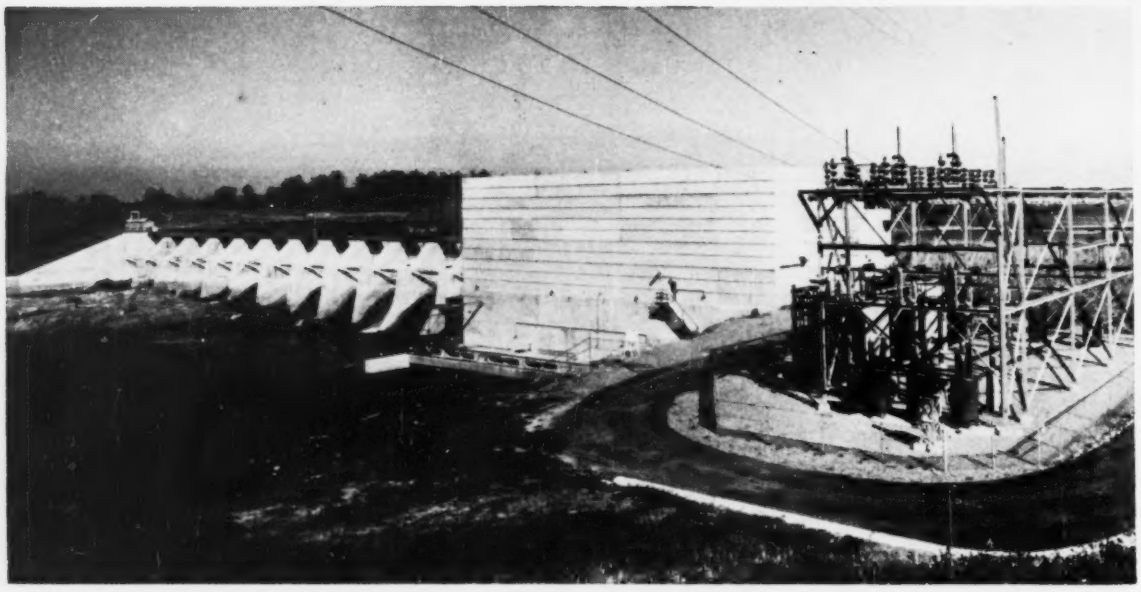
Operation of the transformer differential relays, transformer oil temperature relays (85C) or transformer pressure relays (8 psi) will cause all units to reject load, shut down, and lock out. The 115-kv line breaker will also trip and lockout.

Operation of back-up relays on the 115-kv line, designed to assure line de-energization if the line breaker fails to trip, will cause load rejection, shutdown, and lockout of all units.

Operation of the 115-kv line and ground relays will trip the line breaker, cause immediate load rejection, and shut down all generating units, but will not lock out any equipment. Operation of generator overspeed device will shut down and lock out the unit.

Normal Operation . . . Under normal operating conditions protective features will cause a unit to reduce load to zero at a normal rate, then shut it down and lock it out in case of:

1. Hot generator bearing or high oil level due to cooling water leaking into thrust bearing casing.
2. Field failure or incomplete starting sequence.
3. Hot turbine bearing.



TEMPERATURES FROM +105 TO —40F have no appreciable effect on performance or operation of plant, which has no windows, no heating system, no synchronizing and no operators. 115/6.9-kva transformers in substation are separated by concrete barriers.

4. Loss of thrust bearing cooling water pressure.
5. Loss of turbine guide bearing lubricating oil pressure.

Operation of the following protective devices will cause a unit to drop its load in a normal manner and shut down but will not lock it out. The unit can be restarted when the protective device causing the shutdown has reset itself:

1. Direct current overvoltage on the exciter.
2. Alternating current thermal overload on the generator, determined by overcurrent relays.
3. Low governor oil pressure.
4. Operation of the trash rack differential device, which means that the water level differential through the racks is five feet.
5. Closing the turbine gates to the no-load position while the generator breaker is closed.
6. Generator overvoltage.

Powerhouse . . . The spillway section of the dam is equipped with 13 tainter gates 30 ft wide and 23 ft high. Any two of the first four gates adjacent to the powerhouse can be remotely operated (and gate opening remotely indicated) by two motor driven hoists on narrow-gauge railway tracks on the 462-ft spillway deck. These hoists can be used also on the nine other gates with local control only.

The powerhouse structure is 145 ft long and 113 ft high, with a maximum width of 115 ft at the base and a minimum width of 40 ft at the generator room. It has neither windows nor heating plant, but equipment performance and operation have proved very satisfactory throughout an experienced outdoor range of +105F to —40F. Indoor temperatures on warmest days were 10F above the outdoor temperatures only in the upper area of the generator room. On coldest days the minimum indoor temperature did not drop below +40F, with units running only during short peaking periods.

Power is generated by three 12,500-kva, 90% pf, 6.9-kv, 120-rpm, vertical umbrella-type generators, driven by 16,000-hp 42-ft head, fixed-propeller type turbines, having a discharge capacity of 3,900 cfs at efficient gate. Each generator is equipped with a direct-coupled main and pilot exciter and a permanent magnet generator.

The rotating element of each unit is supported by a water-cooled Kingsbury type thrust bearing, designed for a dead load of 150,000 lb and a live load of 250,000 lb, and is immersed, together with the generator guide bearing, in a closed steel housing holding approximately 900 gal of oil.

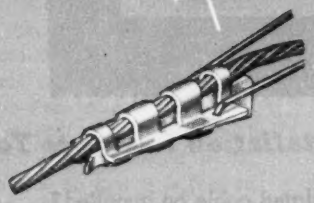
Cabinet-type governor actuators provide oil at 250-lb pressure to supply piston-type servomotors, two for each turbine, for operation of the wicket-gate mechanisms. A six-cycle permanent magnet generator, located on top of each unit, supplies a synchronous motor in the governor actuator cabinet, and, through fly balls, determines the load or speed of the machine. The actuator is equipped with load-limit controls, variable speed droop, and a solenoid-operated automatic valve for applying brakes to the generator rotor rim on shutdown. The generator's brakes are air-operated from a common supply header at 100-lb pressure.

Electrical Connections . . . Plant design is of unit type. Each generator is connected to the 115-kv bus through a 6.9-kv air circuit breaker; a 12,500 kva, forced air cooled, three-phase transformer; and a 115-kv air break switch. The 115-kv bus is connected to the system through a 115-kv line oil circuit breaker which is remotely controlled from Wissota hydro plant.

Two 1,000-MCM compound insulated, Neoprene-jacketed cables per phase connect the generator, through a 6.9-kv air circuit breaker, to the low side of its three-phase transformer. Each generator is grounded through a 50-kva distribution transformer with a resistor-loaded secondary winding.

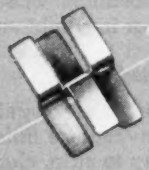
Auxiliaries . . . Station auxiliary power is supplied from either of two 225-kva,

Increase Efficiency... Reduce Maintenance With KEARNEY Pole Line Equipment Designed to Help Your Linemen Do a Better Job FASTER!



Dead End Self-Supporting Bare Neutral Service Cables with the KEARNEY WEDGE-TITE CLAMP

The Kearney Wedge-Tite Clamp is built with a serrated wedge that grips the bare wire with a force proportional to the strain put upon it. This strain is not transmitted to the insulated conductors thus eliminating insulation creep and the danger of leakage and shorts.



Serve Guy Wire Strand Ends Permanently with the KEARNEY FINGER GRIP GUY CLIP

To use this clip no special tools are required and it is impossible to position incorrectly. These clips are easily inserted between the strands and tabs are bent around the wires. Clip is made of aluminum and will outlast the strand itself. Faster and neater than using waste strand.

Seal Out Oxidation and Corrosion on Any Connection with KEARNEY AIRSEAL

Kearney Airseal is a pliable high-dielectric compound which is chemically inert. It is the most nearly perfect material on the market today for sealing out moisture, oxidation and corrosion. Airseal is applied by kneading it over the terminal or connector to be protected, forming a protective coating impervious to moisture and contaminated atmospheres. For any connection protection problem—investigate Kearney Airseal.

Eliminate Radio Interference— Use KEARNEY NON-STATIC GROUND WIRE CLIP

Ordinary staples are entirely inefficient in securing ground wires because the contact pressure is dependent upon their hold in the wood and loosening causes air gaps to develop between staple and ground wire. These air gaps cause radio interference.

The Kearney Non-Static Clip completely eliminates the air gap and resultant interference because the pressure between the clip and wire is entirely independent of the clip's grip in the wood.

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO.

JAMES R. KEARNEY CORPORATION
4224-42 Clayton Avenue, St. Louis 10, Mo.
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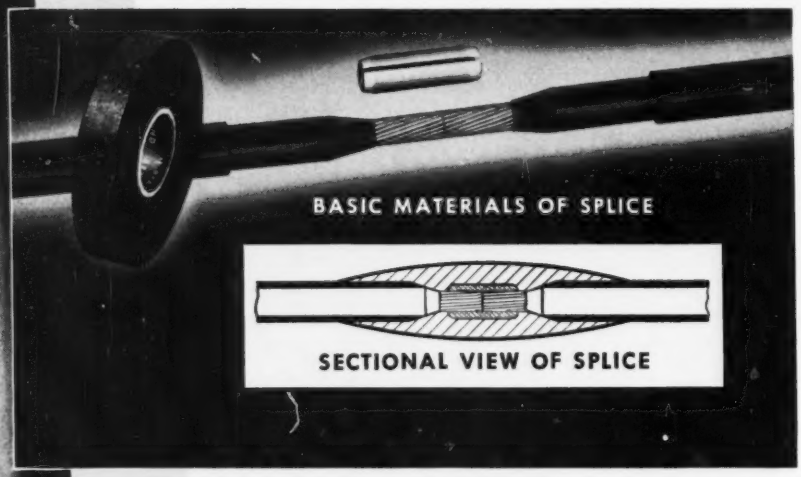
KEARNEY *Gives a Little More for a Little Less*

Through Engineering

JRK-196

Rome RoZone®

Superior Ozone-Resistant Insulation Deserves Your CONFIDENCE



What its Ease of Installation Means to You

Q: Where can RoZone insulated cable be installed?

A: It is successfully installed in any location, whether direct in earth, in conduit, in racks, overhead or in combination runs.

Q: How is RoZone spliced and terminated?

A: Splicing and terminating can be accomplished by simple manual methods that have been time proven—require little experience. No potheads are necessary. It is easy to strip, clean to handle.

Q: Why are fewer splices required with RoZone?

A: It can be manufactured in longer lengths and its light weight makes it possible to pull these lengths easily. As a nonmetallic sheathed cable, it does not require special lubricants.

Q: Can RoZone be joined to other types of cables?

A: Yes. By proper splicing techniques, RoZone may be joined to most other types of cable.

Ease of installation, combined with exceptional resistance to aging, corona, and ozone cutting plus low dielectric loss and excellent electrical stability in water, is why RoZone deserves your confidence. For complete information, send for the Rome Power and Control Cable Catalog.

It Costs Less to Buy the Best

RoZone is approved and accepted by leading utilities, industrials and consulting engineers

ROME CABLE
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and
TORRANCE · CALIFORNIA

ROME CABLE ROME, N.Y.

three-phase, 6,900/460-v, dry-type transformers equipped with 6,900-v high interrupting capacity disconnecting fuses. One transformer is connected to the line side of No. 1 generator and the other to the line side of No. 3 generator circuit. A companion pair of 50-kva, single-phase, 6,900/115-230-v transformers supply lighting and low voltage power. Preference switching and automatic throwover are provided on the low voltage side of the station auxiliary banks.

If station auxiliary power is lost because of tripping of the 115-kv line breaker when no generators are running, No. 1 or No. 3 generator will automatically start and satisfy the station auxiliary requirements. A pre-set selector switch determines which of the two generators will operate under this condition.

A high capacity 6-psi reciprocating blower, driven by a 30-hp three-phase motor, supplies air to the bubbler system, which keeps the pond ice free from the faces of the tainer gates. One gate, adjacent to the powerhouse, is equipped with electric heating elements embedded in the gate sill and seal wearing plates and is insulated on the downstream side so that it is free to operate during the winter.

Two 2-hp induction motor-driven compressors supply air for governor oil cushions at 250 psi and for house use and generator braking at 100 psi. The motors are provided with preference selection and automatic throwover.

Thermostatically-controlled, air-operated, intake and bypass louvers permit generator cooling air to be taken from inside or outside the building, and three 7½-hp thermostatically controlled ceiling fans, one located directly over each generator, exhaust the heated air.

Two 10-hp, three-phase motor-driven pumps, controlled by header pressure switches and provided with preference switching and automatic throwover, supply a common cooling water header for the generator thrust bearings.

Duplicate a-c and d-c, ½-hp, pressure-switch-actuated lubricating oil pumps are installed for each turbine guide bearing. Duplicate a-c and d-c, ¼-hp float-actuated sump pumps are also installed on the head cover of each unit to prevent flooding of the guide bearing by leakage water. Duplicate a-c and d-c, 2-hp, float-actuated plant sump pumps dispose of drips and drains discharged into a sump 13 ft below normal tailwater. Alternating current operation is normal for all of these pump sets with emergency direct current operation, from the station control battery, actuating station annunciator and alarm.

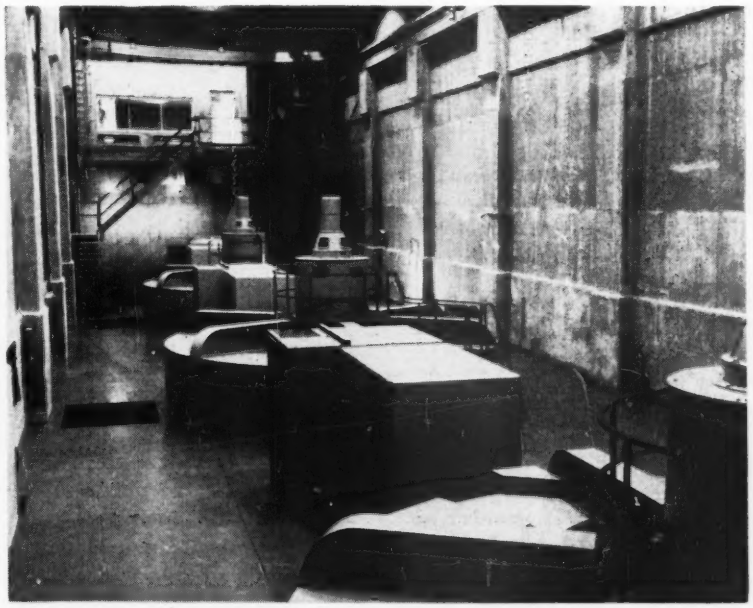
Annunciator and Alarms . . . In addition to annunciation and alarms for all of the items listed in the shutdown categories above, the following protective features provide for annunciation and alarm only:

1. Ground or undervoltage on the station control battery.
2. Any generator on manual control.
3. Loss of power (440 volts) for all tainter gates.
4. Low oil level in thrust and guide bearing housing of any generator.
5. Low oil flow or high bearing oil temperature on any unit.
6. One foot differential water level through the trash rack.
7. High pond level.
8. High transformer oil temperature (60C).
9. Low air pressure on 115-kv ocb operating mechanism.
10. Direct current guide bearing oil pump on any turbine.
11. Direct current sump pump on any turbine.
12. Water in station sump above level where a-c pump starts but below the point where d-c pump starts, indicating that the a-c pump is unable to handle the sump water.

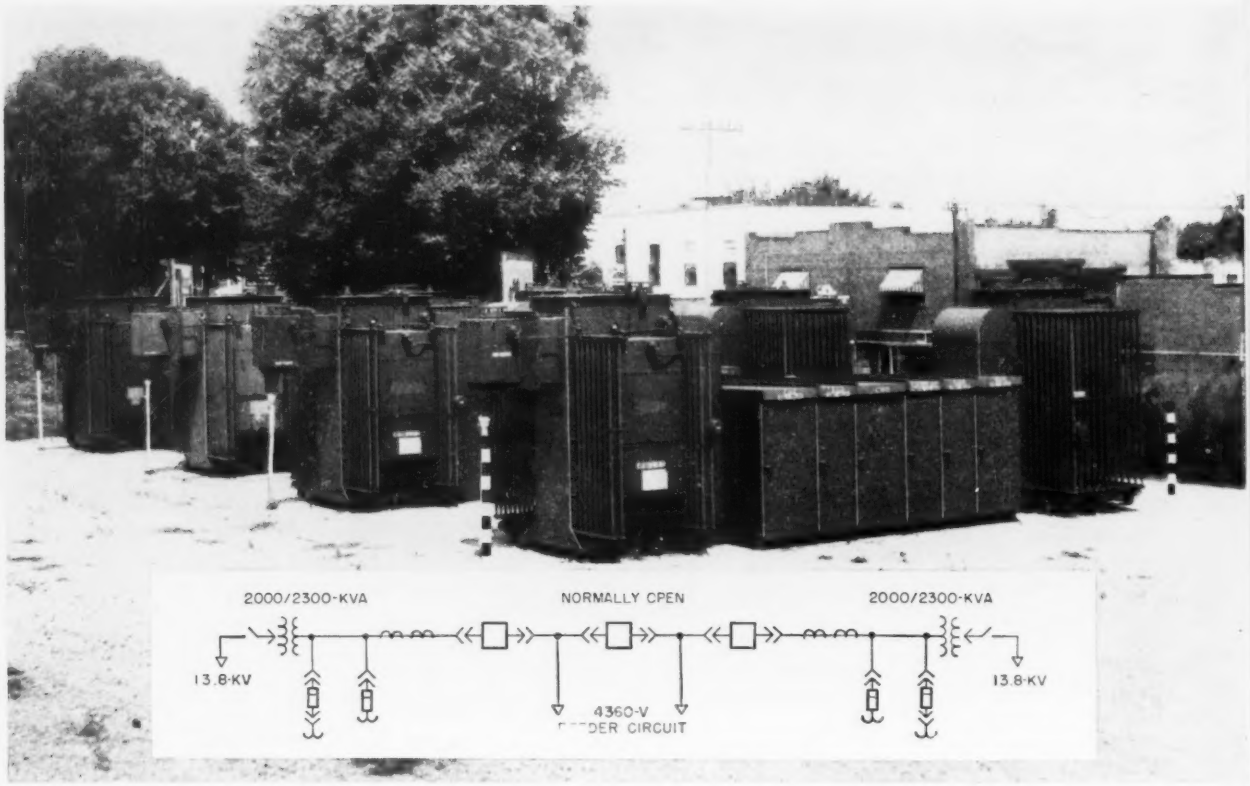
The annunciator at Holcombe consists of a panel containing 40 signal lights, of which 30 are in use, and an audible bell alarm, together with the necessary midget-type telephone relays to perform the annunciator functions.

Associated with the annunciator is an alarm code sender, which permits the Wissota operator to obtain the same information by an audible coded signal that a local operator at Holcombe obtains by observing the annunciator panel lights. Coded signals received at Wissota are in the form of two or three digit numbers. They consist of a single stroke of a gong with slight pauses between the digits.

Whenever a condition develops which causes the annunciator to operate, a carrier signal transmitted to Wissota calls the operator's attention to the fact that the Holcombe annunciator has operated. The Wissota operator will then operate his supervisory equipment to call for the coded signals which have been set up at Holcombe, and such signals are transmitted twice. The Wissota operator can then reset the annunciator for further alarms.



THREE 12,500-KVA GENERATORS are remote-controlled. Governor actuators, generator breakers, and local controls are in metal-clad cabinets. Traveling crane and visitors gallery are in background, recirculating air gratings in floor.



"BLOCK BUILDING" in Kansas City. Substation 45 points up "building block" method. Two G-E 4000/4600-kva master unit substations were installed in 1947, two more in 1949. One-line diagram (inset) shows type of standardized duplex station used.

Missouri utility plans ahead for expansion using standardized G-E unit substations

Kansas City Power & Light gains system flexibility with "building block" approach

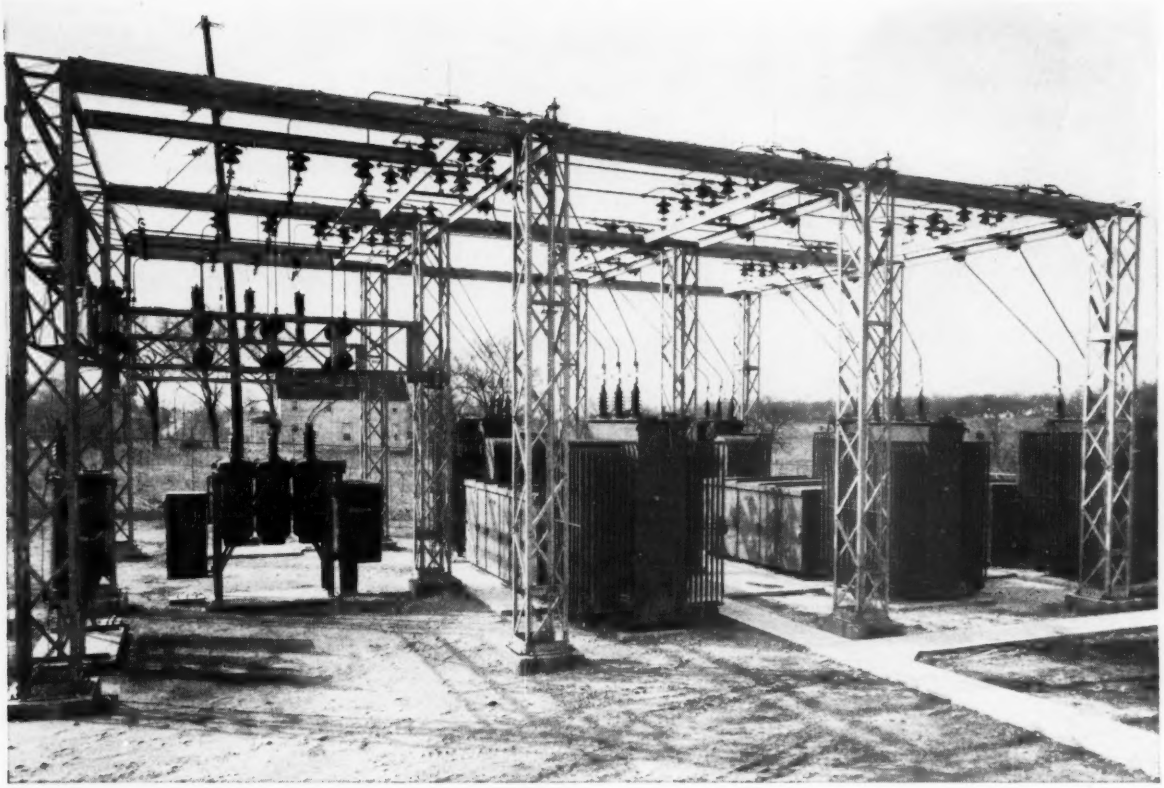
With 22 G-E standardized master unit substations installed over a five-year period, Kansas City Power & Light Co., Kansas City, Mo., knows the value of advanced planning—using duplicate units as "building blocks" in its system.

This "building block" method—which permits adding or removing capacity in easily handled, relatively small "blocks of power"—has enabled the Missouri utility to expand its system simply and economically. Engineers early decided upon the unit substation which best suited their purposes—in this instance, a G-E 4600-kva duplex unit.

In addition, utility engineers have achieved maximum flexibility to take care of unexpected load growth. They can meet load shifts simply by shifting the standardized G-E units. If the load should change radically, they can move quickly to other types of standardized G-E unit substations, still employing the "building block" approach.

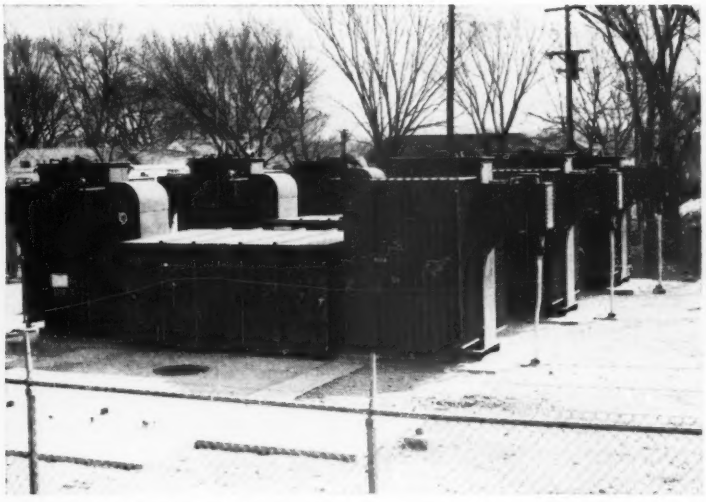
Your needs most likely parallel those of the Kansas City utility, and you, too, will find that advanced planning with the "building block" method keeps system investment as low as possible in relation to actual load. Small "blocks of power," with their flexibility and economy, give insurance against excessive investment in unused capacity.

At the same time, **G-E** factory-assembled master unit substations simplify planning and purchasing—save time in delivery and installation. And with G-E equipment, you are assured of dependable, first-quality components made possible by repetitive manufacturing methods. For full information, write for Bulletin GEA-4500. *General Electric Company, Schenectady 5, New York.* 321-100



STANDARDIZED SUBSTATION. Supplied complete by General Electric, 3 units and steel structure of Substation 30 were delivered ready for immediate installation. Factory-engineered substations simplify purchasing, save valuable engineering time.

CONCEALED BY TREES. This one-unit substation in residential area shows how proper planting can effectively camouflage installations.



READY FOR NEXT UNIT. Kansas City's Substation 84 has three duplex units already installed. Foundation, in foreground, is set for fourth unit, if required for increased load.

GENERAL ELECTRIC

No. 5
IN A SERIES

AN ENGINEER ASKS—

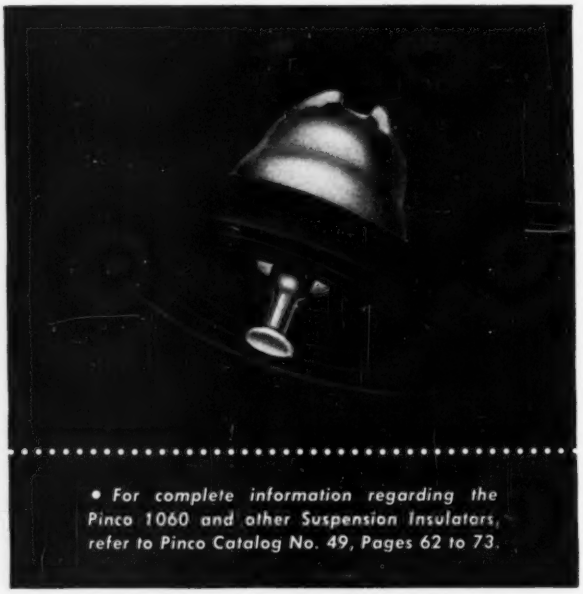
"why, even in severe sleet storms which caused conductor and tower failures, have we never had a mechanical failure with a PINCO 1060?"

HERE'S THE REASON

The answer to this question can be summed up in one statement . . . it is because Pinco Suspension Units are *designed and built to meet service needs* and not just to meet specification requirements. In other words, the correct basic design and rugged construction of Pinco Suspension Units provide extra mechanical and electrical strength for that added margin of safety even under the worst operating conditions.

PINCO SUSPENSION INSULATORS are *better* insulators because—

they are 10% HEAVIER!...
at least 20% STRONGER!...
and 25% BETTER ON IMPACT TESTS!... **proof that they are always "RIGHT *for* the Job" and "RIGHT *on* the Job." Remember this when you specify and buy suspension insulators.**



• *For complete information regarding the Pinco 1060 and other Suspension Insulators, refer to Pinco Catalog No. 49, Pages 62 to 73.*

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RIGHT ON THE JOB—

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INDUSTRIAL RELATIONS

Job Opportunities

AG&E Service Corp officials, faculty members discuss careers for engineers with utilities

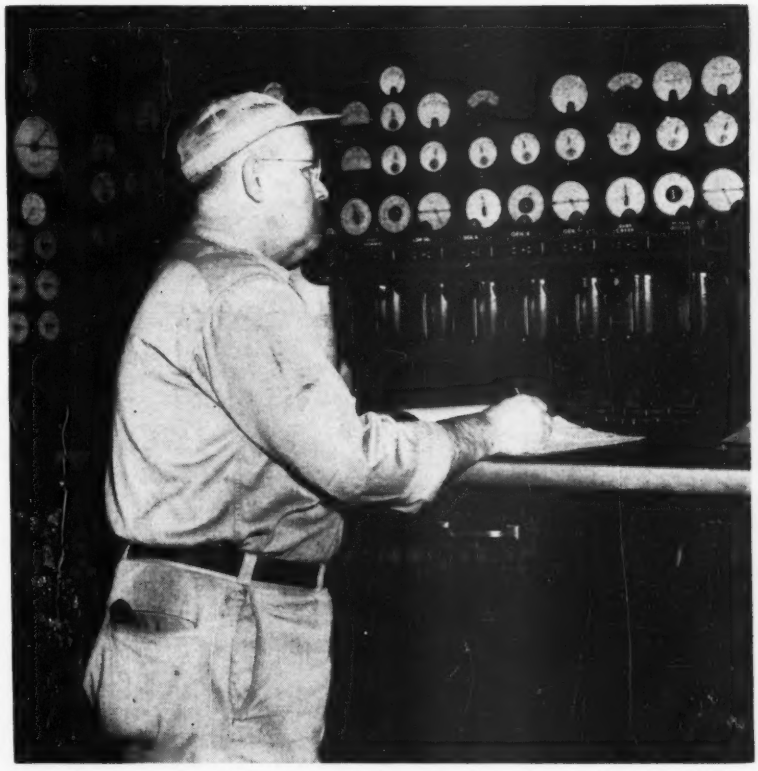
An outline of the opportunities and challenges facing young engineers in the electric industry was discussed by Pres Philip Sporn and other executives of the American Gas & Electric Service Corp at a recent all-day meeting in New York City for 43 faculty members representing 16 eastern engineering colleges. The meeting was sponsored by the AG&E organization.

Facing the mounting problem of recruiting technical graduates, the AG&E executives attempted to show that engineering practice in the industry is constantly moving ahead.

New Problems Daily . . . These executives emphasized that new engineering and operating problems arise almost daily in the course of their company's current eight-year, $680.3 million expansion program, and in its continuous search for more efficient operation in the face of rising costs.

The AG&E president sought to convince the faculty representatives that AG&E and its subsidiaries, particularly by virtue of their constant research and development program and "pioneering" approach to many of the industry's problems, are a desirable choice of career for young engineers, both electrical and mechanical.

Selling Engineering Students . . . The session also afforded an opportunity for the college and university people to tell AG&E what it could do to improve its job of "selling" college engineering students on the industry in general and its company in particular. Among other things, they pointed out, that college seniors usually have their field picked out well ahead of graduation and that the freshman class, or even high school seniors, should be the recruiting "target."



Keeping Con Ed's Employees Informed

Plant employee is listening to a "recorder-reproducer" giving him the latest operational information on Consolidated Edison Co's system. He had just dialed a code number in the company's telephone hookup. Information coming over the phone includes production figures, any station and distribution troubles, the explanation for any customer outages. The company believes the arrangement will help show each interested employee the part he plays in overall system operation. Con Edison's internal communications have been difficult because of the large number of employees.

Part of a typical report is "Electric Production: Waterside. Inspection to No. 6 unit is still in progress. East River No. 5 boiler removed from service for bearing replacement on secondary air fan. Electric Distribution: Tie feeder No. 526 Waterside to Hell Gate restored to service following trouble reported yesterday. Manhole fire at intersection of 238th Street and Avenue B, the Bronx, resulted in loss of two sections of main. No customer interruption."

LABOR BRIEFS

"Union Objectives and Management Policies" will be one of the topics to be discussed at General Management Conference of American Management Association at Hotel Statler, Los Angeles, Calif., on Jan 12-15 . . . **American industry** is offering the new college graduate higher salaries than ever before, but there still will not be enough men to meet the demand, according to the seventh annual nation-wide survey released by Dr Frank S. Endicott, director of placement at Northwestern University . . . **General Electric Co** has announced that 50 fellowships for study at Union College of new developments in science and their application in industry will be awarded to high school teachers in 1953 . . . **Wage Stabilization Committee,** successor to the Wage Stabilization Board, has approved pay increases of 5% for 200,000 General Electric Co workers. The committee also told its staff to approve similar boosts for workers in other electrical manufacturing companies, including Westinghouse Electric Corp and Sylvania Electric Products Co . . . **Tennessee Valley Authority** has granted a 5.3% wage increase for 12,000 workers.

Super-Speed

20-20-20-Cycle Repetitive Reclosing in a 3-Cycle Production-Built Breaker

HERE'S THE FIRST BREAKER with both full mechanical trip-free pneumatic operation and super-speed repetitive reclosing.

Key features of this faster and more powerful operating mechanism are:

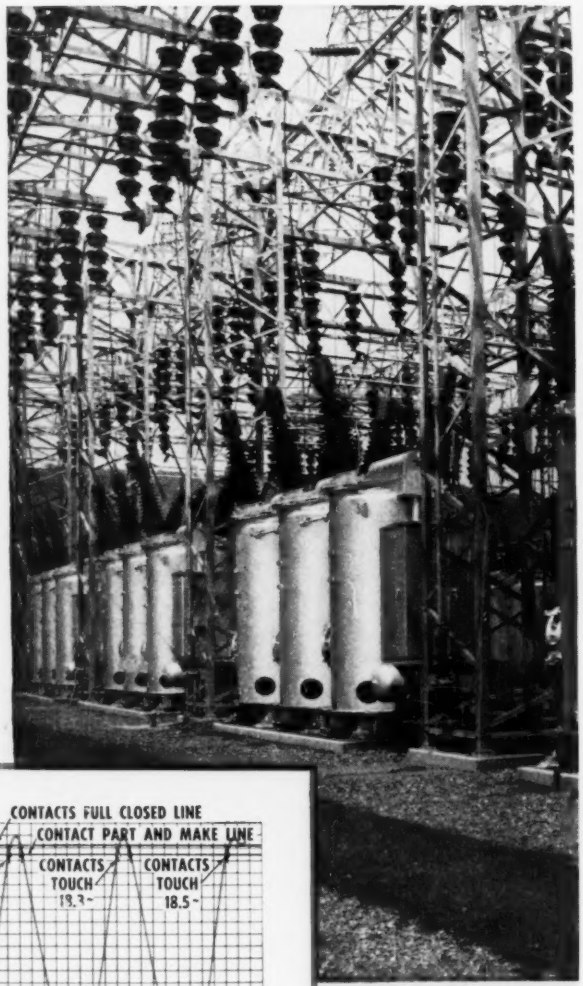
- Low energy—sure acting tripping mechanism.
- Simple conventional control circuit with single trip coil — breaker *always* opens mechanically trip-free.
- An instantaneous air dumping system on the closing cylinder allows ultra-fast recoupling for "20-20-20" repetitive reclosing.

15 YEARS' FIELD EXPERIENCE BACKS DESIGN

This design is the result of research plus experience gained on thousands of units since 1937 when Allis-Chalmers originated the mechanically trip-free pneumatic operator.

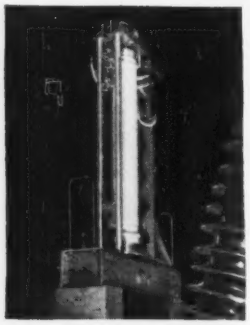
For more information about Allis-Chalmers power oil circuit breakers call your nearby A-C district office, or write Allis-Chalmers, Milwaukee 1, Wisconsin.

A-3928

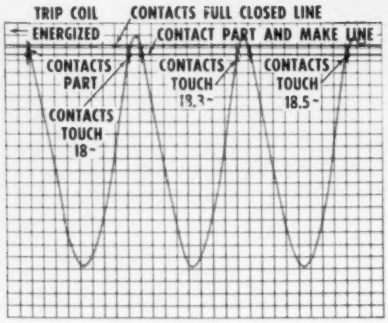


Recent installation of BZO-160 power oil circuit breakers with super-speed mechanically trip-free pneumatic operators.

Tests Prove High Speed Action of Breaker



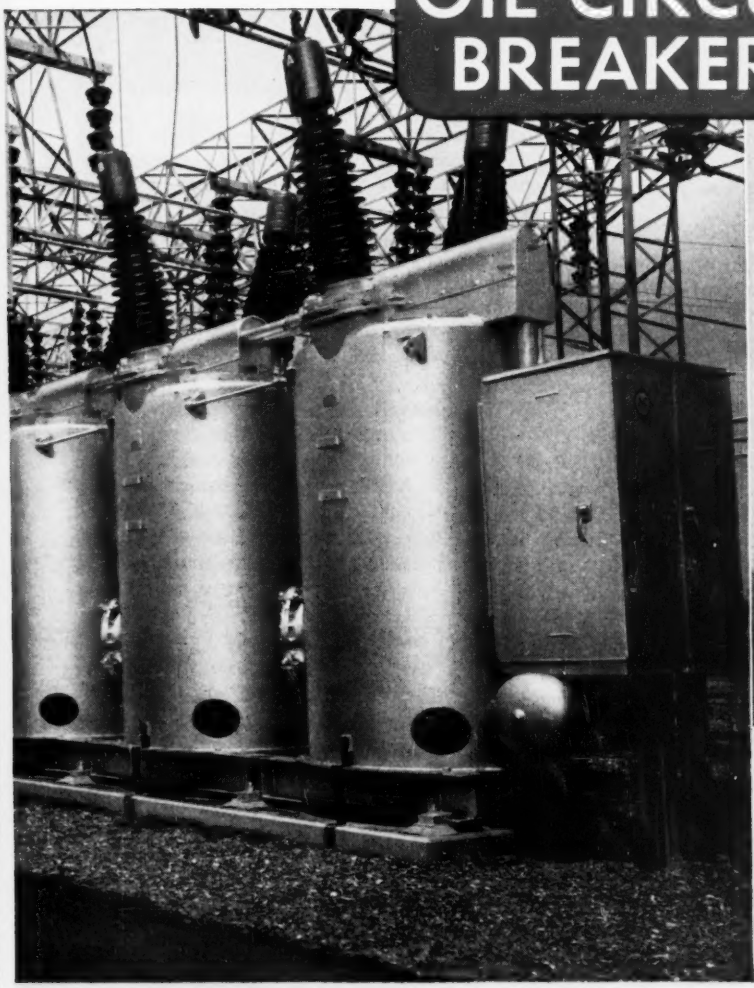
Speed recording device

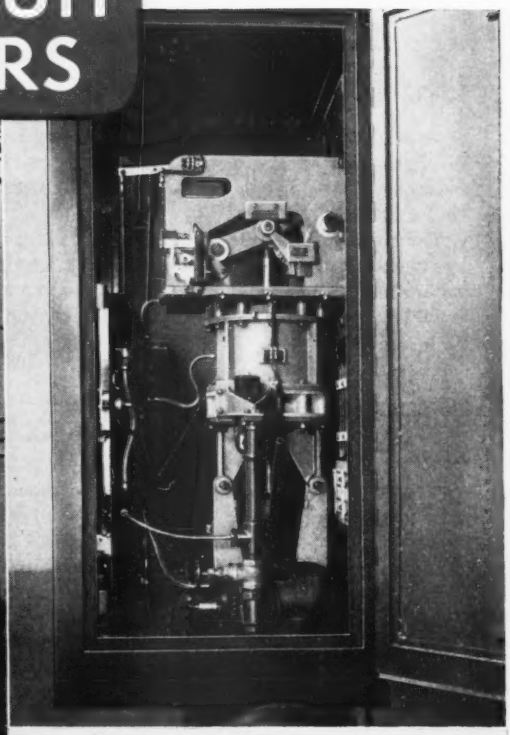


Typical speedgraph from production breaker shows high speed repetitive reclosing.

Operation!

ALLIS-CHALMERS Power OIL CIRCUIT BREAKERS





Super-speed Operator for 3-cycle breakers. Mechanically trip-free mechanism above closing cylinder, extra large exhaust and maintenance closing device below, accessible from either side or front.

Type BZO-160 . . . 3 and 5 cycle. Ratings in production up to 230 kv, up to 10,000,000 kva i.c.

ALLIS-CHALMERS

Originators of Full Mechanical Trip-Free Pneumatic Operators.

PUBLIC RELATIONS & ADVERTISING

Urquhart Station Will Look Like This . . .

. . . is what this model told visitors at the state fair at Columbia, S. C. The plant, with an initial capacity of 150,000 kw in two units, is being built by South Carolina Electric & Gas Co for operation in 1953.

The model, ⅛ in. to the foot, was completely handmade by Engineering Models, Wilmington, Del., from the architect's prints. A panorama surrounds the model and shows a community including homes, church, school, stores, a textile mill, and cotton gin. These models were made also to scale by William Scheffler, chief machinist at the company's Parr Station. T. A. Garrett, Charleston, displayman for the company, was responsible for the assemblying of the entire exhibit and designing the panorama.

Another unit in the exhibit was a cut-away model showing the boilers which will be installed in the station. This model was borrowed from Metropolitan Edison Co.

Carolina P&L Sets Up Road and Radio Show

A combination vaudeville show and radio program will go on the road this month to "help build a Finer Carolina." It will also take the story of Carolina Power & Light right to the homes of its customers.

Christened the "Finer Carolina Show," the new radio program will be directed by Fred Fletcher of Raleigh's WRAL and will feature the music and comedy of his team of performers, already well known in eastern North Carolina.

The show will be a half-hour program presented each week over the "Finer Carolina network"—about 23 Carolina radio stations. The programs will originate in the various towns participating in CP&L's Finer Carolina Contest and will be tape-recorded for later broadcast.

For the "studio" audience the Fletcher group will present a 90-minute show. Local contest chairmen will be invited to participate in the broadcast to publicize their contest progress.

Prize awards to the winners of the first "Finer Carolina" contest will be presented this month.

AD COPY THEMES

Alabama Power Co—"Not Just Any Old Light" is head for an ad telling of the advantages of having proper lighting in the home so that children can study without straining their eyes.

Arkansas Power & Light Co—"Your Friends—Items of interest about some of the good neighbors who serve you 24 hours a day." This is the head and bank over a series of two-column ads. A recent one consisted of five pictures with captions. Subjects covered included: Two girls employed by the company drying records after a fire had destroyed a company office; an executive who has risen from the ranks; a manager turning over a donation of employees to a hospital; a service pole shattered by a motorist; and the 100th employee to enter military service since Korea. The company name does not appear in large type but is included in each caption.

Connecticut Light & Power Co—"More Power to You!" is head on ad telling of company's expansion program.

Kansas City Power & Light Co—"Times have changed!" is a new series of ads pushing electric cooking. Each ad has at the top an excellent illustration contrasting an old model of something with the new. Used so far have been steamboats, trains, and airplanes.

PR&A BRIEFS

Consolidated Edison Co of New York is now using car cards in New York City subways, buses, and street cars. These transportation lines carry more than 300 million passengers a month. At any given time about 10,000 cards will be on display . . . The **Electric Companies Advertising Program** has renewed its contract with the ABC radio network to sponsor "Meet Corliss Archer" for the 52 weeks beginning Jan. 2. The program is broadcast each Friday 9:30 to 10 pm EST . . . **Dayton Power & Light Co** has published a 16-page booklet, "Your Opportunity for Industrial Progress," depicting the industrial advantages of the company's service area. For a copy write: Area Development Department, Dayton Power & Light Co, 25 North Main Street, Dayton 1, Ohio.

Besides an eventual 17,000 homes, each with garbage disposer, Lakewood Park boasts largest suburban shopping center in world, including three major department stores

Promotional shots like this, combining leg art with disposers, helped plug home sales

"World's Largest Garbage-Free Community"

Installation of garbage disposers helps to promote use of other electrical appliances in the home. This is the opinion of Southern California Edison Co, Los Angeles, which has seen the 100% installation of disposers in a large housing development spread electrification of the home throughout the Los Angeles area.

Lakewood Park, "world's largest garbage-free community," is 18 miles from downtown Los Angeles. It now has 12,000 homes completed and 3,700 in the building stage; all of them have garbage disposers.

In promoting 100% use of disposers the manufacturer argued that general sanitation and cleanliness of the community would be more easily maintained; homes would be more desirable and would sell more quickly; overall value of homes would be increased.

Although the developers didn't accept the idea at once, they were persuaded to give the disposers a try-out in a 135-home tract under construction.

A survey taken after the homes in the test tract were sold revealed that buyers were more impressed by garbage disposers than by any other single feature.

Still cautious about a project with an eventual 17,000 homes, the developers approached officials of Los Angeles County. The health department was immediately enthusiastic at the idea of a community without the disease breeders of garbage pails and garbage trucks.

County engineer's office and Country Sanitation District readily accepted the proposal. They decided that standard sewage lines could take the added solids without trouble, and that any increase in maintenance cost for the lines and at the sewage treatment plant would be made up by additional revenue from the plant's fertilizer output.

The county took a positive interest because of a growing problem in garbage disposal.

Southern California Edison Co, which serves the development, seconded the disposer manufacturer's arguments and helped plan wiring installations through its adequate wiring consultants. The manufacturer gave the developers a guarantee of low service requirements and agreed to provide constant service facilities for the disposers.

Edison agreed to provide a staff of home economists to show each homeowner the most efficient way to use the disposers.

That results have been satisfactory is indicated by a statement of one of the developers:

"I'd never build a tract now without garbage disposers. The public's response far exceeded expectations. The disposer has probably been the most outstanding item in the whole Lakewood Park home package as an attention-getter and selling point."

Movie Dramatizes Octopus in the House

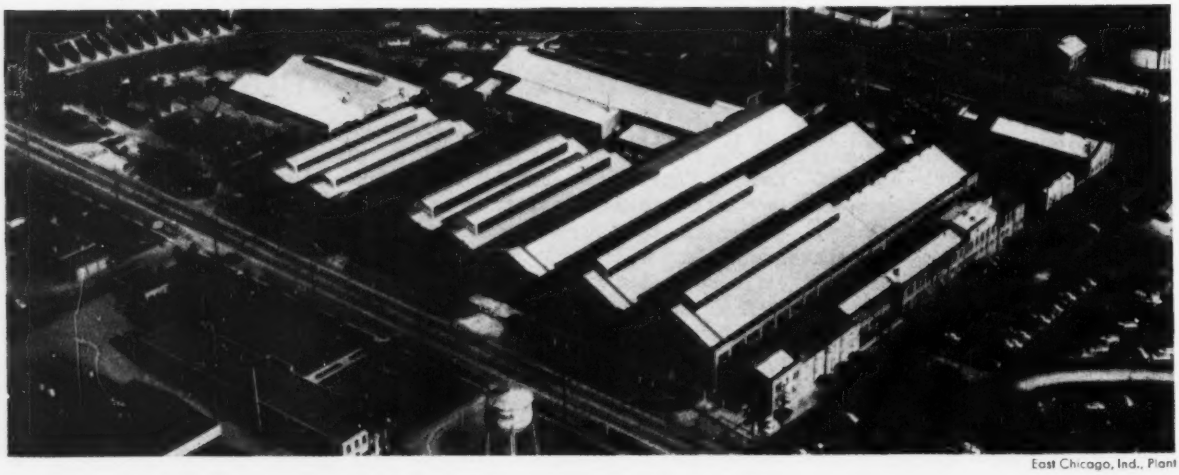
The importance of adequate wiring in the homes of today so that full advantage can be taken of the many conveniences that go to make up modern electrical living is entertainingly told in a new 28-minute, 16mm, live-action sound movie. It has been produced and released by National Electric Products Corp of Pittsburgh, Pa.

Photographed in full color and enacted by a cast of actors known to the Broadway stage, the radio and television, the film, entitled "Octopus in the House," stresses the fact that well-planned wiring is necessary for the home of today.

The approach to the subject is in a humorous style yet much practical information about better wiring, and efficient planning for electrical living, is contained in the film's story. For information about booking the picture, write National Electric Products Corp, 13th Floor, Chamber of Commerce Building, Pittsburgh 19, Pa.

Chattanooga, Tenn., Plant

50% capacity increase at these COMBUSTION Plants



East Chicago, Ind., Plant

Expansion of facilities has been the order of the day for years past at Combustion's plants in Chattanooga, Monongahela, Chicago, East Chicago and St. Louis. This expansion has been necessary to meet the ever increasing demand for the company's line of boilers and related equipment resulting from the vast growth of the power industry both in the United States and abroad.

Today, with the company's backlog of orders at an all-time high, an accelerated program of expansion is well under way at the company's two largest plants—Chattanooga and East Chicago. This multi-million dollar program, begun early in 1952 and scheduled for completion by mid-1953, will effect a 50 per cent increase in the production capacity of these two plants. This increase will add nearly six acres of manufacturing area fully equipped with the most modern machine tools and special fabricating facilities.

With these added facilities, Combustion will be able to further expedite its delivery of boilers and related equipment for all power, process and heating applications in unit capacities from 2500 pounds of steam per hour up to the largest utility requirements.

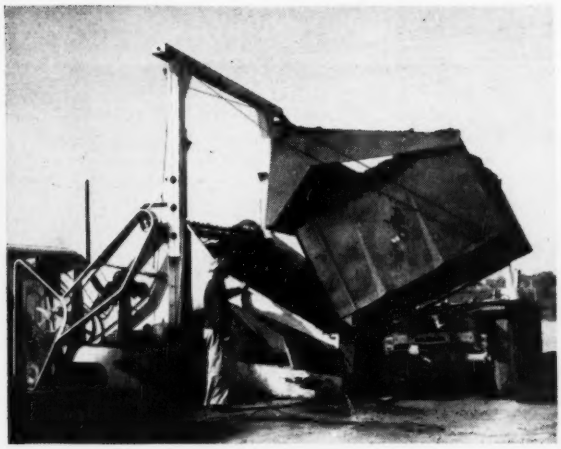
ALL TYPES OF STEAM GENERATING, FUEL BURNING AND RELATED EQUIPMENT

8-636

C-E

COMBUSTION ENGINEERING—SUPERHEATER, INC.

Combustion Engineering Building • 200 Madison Avenue, New York 16, N. Y.



ELECTRIC DUMPER is first of several devices used in preparing alfalfa meal. It delivers alfalfa to chopper which readies it for drying

DRYING DRUMS literally burn all moisture from chopped alfalfa and reduce it to a dry meal. Each drum is revolved to prevent burning

Electricity Helps Alfalfa Keep Its Vitamin A

Importance of electric power in farm productive operations is emphasized by a 722 hp motor load which is helping produce alfalfa meal with a higher vitamin A content at the Hal Bogle Farms, Inc., near Chandler, Ariz. It does this without losing any vitamins, which wasn't possible under the old sun-curing process.

After the alfalfa is cut and loaded in the field, it is dropped into a chopper by a dumping rig powered by a 3-hp motor. The chopper uses a 5-hp motor.

Following the chopping operation, the alfalfa goes into a drying drum. To keep the forage from "burning" during the drying process, the drum is revolved by a 5-hp motor. Hot air is blown through the drum by fans powered by a 50-hp motor.

With the alfalfa reduced to a dry meal after drying, it is passed through two grinding operations, each requiring a 150-hp motor. After grinding, the meal is sacked electrically, in an operation requiring 20 hp for each sacker. A dust collector to absorb excess dust uses another 3-hp motor.

Units are in duplicate at the farm, with the exception of the fans which serve both drums. Each complete processing line requires 361 hp. Power is supplied by Arizona Public Service Co.

Infrared Brooder Reduces Mortality of Chicks

WILLIAM R. KOLLMAYR, Farm Service Director,
New Jersey Power & Light Co., Dover, N. J.

Uniformity of baby chicks has been high and mortality low (1%), since brooders with infrared lamps have been installed by De Sapio Brothers, Baptistown, N. J.

The installation consists of 30 brooders in a 60 x 400-ft building. Each brooder has four 250w infrared lamps, an 18-in. high, 10-ft diam guard, and accommodates approximately 400 chicks. Each has two lamps on thermostatic control.

After one week of brooding the baby White Leghorns, the lamps are raised 1 in. above the guard. Lamp raising is increased gradually to a maximum height of 22 in. in six weeks. Shortly the guard is removed and the lamps continued, if needed.

The 30kw load is on a 3-wire service and energy consumption is approximately 1 kwhr per chick.

After the guards are removed, two automatic 4-speed feeders with ½-hp motors are installed. They operate continuously and deliver feed from a 10-ton storage bin to the far ends of the coop, each about 200 ft distant. Water is piped to converted feed troughs.

SEVERAL of 30 brooders installed in one coop. More chicks gather under the two red lamps than under the two white ones in each

AUTOMATIC FEEDERS are supplied from a bin at center of the coop after chicks are six weeks old

Mid South Net Up...

. . . to about $1.95 a common share in 1952 as compared with $1.81 in '51, Dixon tells analysts

Consolidated net earnings of Middle South Utilities, Inc, are expected to be about $1.95 a common share in 1952, Pres E. H. Dixon told the Boston Security Analysts Society recently. This compared with $1.81 a share earned in 1951.

If the benefit of temporary income tax reduction made possible by accelerated amortization certificates were included, earnings would approximate $2.10 a share, he pointed out. Louisiana Power & Light Co, a subsidiary, has been ordered by the Louisiana Public Service Commission to place the tax savings on these amortization certificates in a "reserve for deferred federal income taxes." Middle South intends to continue reporting its consolidated per share earnings on two bases, one with and the other without tax saving.

Federal Income Tax Saving . . . Fast amortization will result in reducing the federal income tax liability of the system by roughly $25 million from 1952 through 1959, Dixon pointed out. A large part of these temporary tax reductions will be utilized in the construction program in lieu of new capital. Use of these funds for payment of added dividends is not now intended, he said.

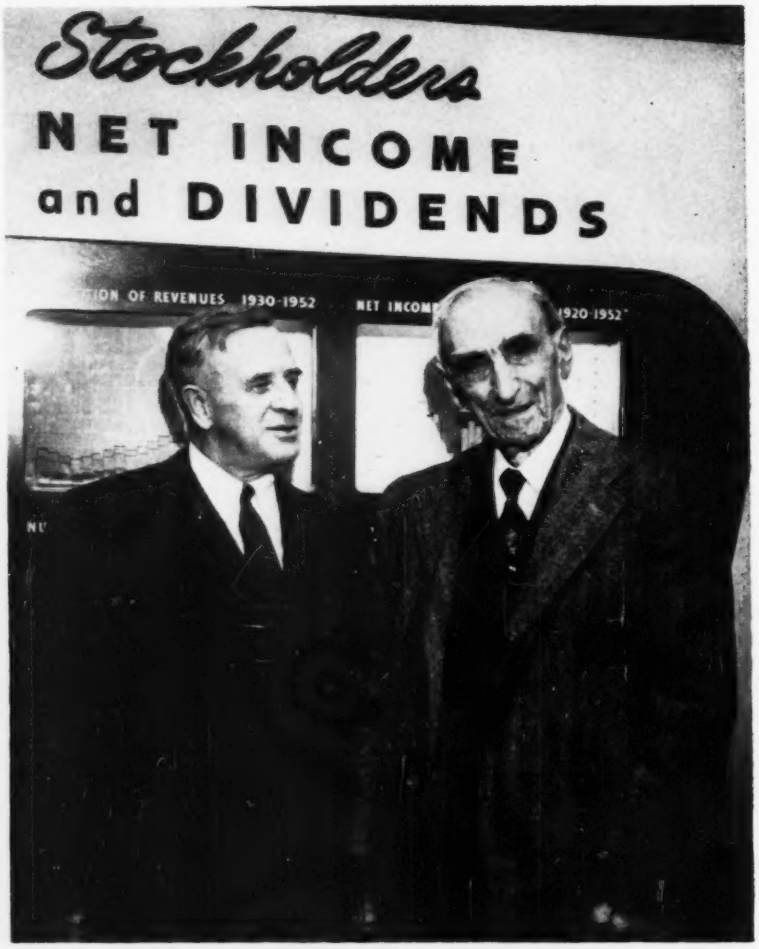
In 1946 the owned generating capacity of the system was only 490,000 kw. It is now 1,275,000 kw. It expects to complete 772,000 kw in 1953 and 1954, and recently it ordered a new 135,000-kw unit for installation in 1955. This will bring owned capacity to about 2,150,000 kw at the end of 1955, at which time the peak load is expected to exceed 1.9 million kw, he pointed out.

Expansion . . . The 1952 construction program will total about $61 million, which is down several million from the original budget, largely because of the steel strike and materials shortages. The 1953 program is expected to exceed $80 million, with the exact amount dependent upon availability of materials. Tentative indications are that construction expenditures in 1954 will be back down to 1952's level.

To finance this construction program, the four system companies plan to market about $50 million in first mortgage bonds during 1953. No definite program was announced for meeting equity money needs of the system companies, but Middle South Utilities intends to utilize a portion of its cash presently on hand and has available a $15-million standby bank credit arranged last spring.

The Middle South president said that "We might, under certain circumstances, consider selling new Middle South common stock some time in 1953 so as to meet our equity requirements and reinstate at least part of the bank credit."

Rate Proceedings . . . The system has no rate cases pending or planned, he declared. Each of the subsidiaries is earning the rate of return to which it is entitled under applicable regulation or other conditions, with the exception of Arkansas Power & Light. That company, Dixon declared, has been showing steady improvement, and its operating results are now getting close to the 6% rate of return allowed.



Oldest Electric Stockholder?

Prentiss M. Brown, Detroit Edison Co chairman, left, is talking to Henry W. Gramlich, right, 101 years old, at a recent special stockholders meeting. Gramlich is believed to be the company's oldest stockholder. He was driven up to the motor city from Kenton, Ohio, 150 miles, by his son Ford. He worked in a bank in Kenton up until the time of his retirement in 1928 at the age of 76.

Straight Line Depreciation Method Gains Wider Use

More and more electric companies are adopting straight line depreciation accounting practices, a recent Federal Power Commission study shows.

There are now 89% of the utilities using the straight line method for depreciation compared with 52% in 1945 and 15% in 1937.

The study shows companies using the method have, on the average, a depreciation reserve ratio of 20.9% and a depreciation expense ratio of 2.35% based on plant accounts at the end of 1951. Both ratios vary significantly among utilities depending on average age and type of property and related factors.

Entitled "Electric Utility Depreciation Practices, 1951," the study includes data on all Class A and B privately-owned utility systems. This includes all companies with annual operating revenues of $250,000 or more.

REGULATION

Nantahala Power & Light Co has received North Carolina Public Utilities Commission approval to increase rates about $35,000 a year . . . **New Jersey Power & Light Co officials** have completed their testimony in the $1.4 million-a-year rate hearing before the New Jersey Board of Public Utility Commissioners. PUC Pres John E. Boswell adjourned the hearing until Feb. 2 for cross examination by Joseph Harrison and Wesley L. Lance, named as co-rate counsel by Attorney General Parsons to represent the public.

From 1946, through the first 11 months of 1952, according to Edison Electric Institute tabulations, there have been a total of 348 applications for rate increases, involving 174 companies. Of the 348 applications, 308 have been granted, 26 are pending, 7 were withdrawn, and 7 denied. The 1952 record shows 77 actions by the commissions: 60 applications were granted, 15 are pending, 2 were denied.

Gulf States Utilities Co has received Louisiana PSC approval to increase rates 20% effective Dec. 18. These new rates are expected to produce about $2.5 million a year.

Today in Utility Finance

YIELDS (%)

Quality	Bonds			Preferred Stocks			Common Stocks		
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
DATE									
1952									
Dec. 24	**2.97**	**3.01**	**3.12**	**4.05**	**4.23**	**4.59**	**5.01**	**5.35**	**5.62**
Dec. 18	2.97	3.01	3.13	4.05	4.20	4.58	5.00	5.34	5.62
3rd 1952	2.99	3.03	3.16	4.10	4.26	4.61	5.18	5.59	5.96
2nd 1952	2.95	3.00	3.09	4.05	4.31	4.60	5.38	5.85	6.42
1st 1952	2.95	2.99	3.13	4.11	4.29	4.66	5.35	6.03	6.47
4th 1951	3.02	3.07	3.21	4.32	4.50	4.91	5.42	6.18	6.84

Data: Reis & Chandler, Inc.

EARNINGS

Company	Period Months	Ended	Net Income 1952	Net Income 1951	Earnings Per Common Share 1952	Earnings Per Common Share 1951
Carolina Power & Light	12	Nov.	$7,107,995	$6,341,512	$....	$....
Houston Lighting & Power	12	Nov.	8,730,844	6,522,444	....	....
New York State Electric & Gas	12	Nov.	7,542,171	6,124,701	2.40(a)	2.11(a)
Pennsylvania Power	12	Nov.	2,120,682	1,773,909	....	....
Southern Canada Power	2	Nov.	240,359	190,131	....	....
Southern Indiana Gas & Electric	12	Nov.	1,853,907	1,704,141	2.10	1.89

Notes—Based on 2,696,950 shares in 1952 and 2,396,950 shares in 1951.

FINANCING

Company and Description	Amount of Offering (000)	Offering Price	Yield to Public
WEEK OF DECEMBER 25-31			
None			
WEEK OF JANUARY 1-7			
None			
SCHEDULE FOR JANUARY—FEBRUARY			
Bonds			**Bid Date**
Salt River Project Agricultural & Improvement District, Ariz.—improvement bonds due 1960-1982	$5,000	.....	Jan. 7
Kansas City Power & Light—1st mtg	12,000	.....	Jan. 20
Ohio Power—1st mtg	22,000	.....	Jan. 20
Iowa-Illinois Gas & Electric—1st mtg	8,000	.....	Jan. 27
Jacksonville, Fla., electric system	18,000	.....	Feb. 3
Preferred Stock			
Ohio Edison—150,000 sh $100 par	$15,000	.....	Jan. 13
Ohio Power—100,000 sh $100 par	10,000	.....	Jan. 20
Iowa-Illinois Gas & Electric—60,000 sh $100 par	6,000	.....	Jan. 27
Common Stock			
Southern California Edison—500,000 sh	.....	.....	Jan. 14
Toledo Edison—600,000 sh	.....	.....	Jan. 13**
Ohio Edison—479,846 sh (to be offered to commonholders on 1-for-10 basis, record Jan. 8 to expire Jan. 23; stockholders to be allowed oversubscription privileges; company will name subscription price)	.....	.....	Jan. 7#
Consumers Power—617,669 sh (to be offered commonholders on 1-for-10 basis, record Jan. 15 to expire Jan. 30; company will name the subscription price)	.....	.....	Jan. 14#
Southwestern Public Service—about 293,500 sh (to be offered to commonholders on 1-for-12 basis; stockholders will be allowed oversubscription privileges)	.....	.....	.....
West Penn Electric—264,000 sh (to be offered commonholders on 1-for-15 basis, record about Jan. 23 to expire about Feb. 9; company will name subscription price)	.....	.....	Jan. 21#
UNSCHEDULED AND UNDER CONSIDERATION			
Bonds			
Central Maine Power—1st general mtg	$10,000	.....	.....
Toledo Edison—1st mtg	7,500	.....	.....
Rockland Light & Power—1st mtg	5,500	.....	.....
Southwestern Public Service—1st mtg	12,000	.....	.....
Wisconsin Public Service—1st mtg	7,560*	.....	.....
Monongahela Power—1st mtg	10,000	.....	.....
Washington Water Power—1st mtg	10,000	.....	.....
Arkansas Power & Light—1st mtg	18,000	.....	.....
Dallas Power & Light—1st mtg	9,000	.....	.....
Debentures			
Washington Water Power	14,000*	.....	.....
Preferred Stock			
Rockland Light & Power	5,500	.....	.....
Southwestern Public Service	2,000	.....	.....
Wisconsin Public Service	2,500*	.....	.....
Common Stock			
Central Maine Power	$5,000	.....	.....

Notes—* Estimated. ** Date expected to be offered by First Boston Corp group, underwriters. # Date of competitive bids of purchase of any unsubscribed shares.

Manufacturers Optimistic About '53

The business outlook for 1953 is optimistic according to year-end statements made by electrical equipment manufacturers.

Some of this optimism is based upon record sales and production figures for 1952. To back up the good records of last year, these firms plan to continue their expansion programs.

General Electric Co, Westinghouse Electric Corp, Allis-Chalmers Manufacturing Co, and Philco Corp have indicated they may hit record sales for 1952. Hotpoint Co's production is expected to soar in the next decade.

General Electric

GE's overall sales for 1952 will approximate $2.6 billion, Pres Ralph J. Cordiner has revealed. This will represent an increase of 12% over 1951. Cordiner said the outlook for 1953 is favorable.

The company's four principal product groups showed substantial gains in the third and fourth quarters.

The apparatus group, which makes heavy electrical industrial machinery, was considerably better in 1952 than in 1951. Cordiner said this reflects the continuing expansion programs of the electric utilities and industry generally. While sales of consumer products in the appliance and electronics group were down in the first six months of 1952, there was a marked improvement in the last half of the year. Cordiner said sales volume for the group in 1952 should be only about 10% behind 1951.

Business in the industrial and lamp products groups also was off for the year as a whole because of lowered demand for consumer goods components, but this group has gained as appliance sales have increased.

Cordiner said that as a result of predicted growth of population by 20 million by 1961 and the constantly growing utilization of electricity, as much electrical equipment will be built in the next ten years as has been built in the entire 75-year history of the industry. Between 1951 and 1961, the installed capacity of the electric utility industry is expected to be more than doubled, he said.

Production of steam turbine-generators by GE during 1952 will total about 5.5 million kw in rated capacity. Despite production losses resulting from the steel strike, output for 1952 exceeded the 1951 record by about 35%. Large steam units produced at the Schenectady plant for central station and industrial use will total approximately 4.8 million kw. The Lynn (Mass.) plant, which manufactures medium-sized machines, will have total production of about 665,000 kw.

GE's expenditures for new plant and equipment in 1952 will total approximately $100 million.

Westinghouse

Westinghouse's sales for 1952 will total more than $1.4 billion, Pres Gwilym A. Price has predicted. He said the outlook for business generally in 1953 appears to be good.

The defense program and the normal needs of industry seem certain to keep Westinghouse industrial product and defense product plants busy in 1953, Price said.

At the forefront of Westinghouse's two-pronged productive effort is the electrical industry. It is aiming at new high levels of defense production, while at the same time increasing output of such consumer goods as appliances and television sets, and such industrial products as turbines, power generators, transformers, and motors.

The demand for and use of electric power will double in the next ten to 12 years and Westinghouse will grow to meet that demand, Price said. Westinghouse since the start of 1946 has invested $245 million in new plants and improved facilities. By 1955, this investment will amount to some $450 million and the increase in productive capacity will be 125%.

Allis-Chalmers

Allis-Chalmers, which will set sales and earnings records in 1952, may do as well in 1953, Pres W. A. Roberts has indicated.

The firm's sales for 1952 are expected to exceed $500 million for the first time in company history with about 20% of business in direct defense work compared with 10% in 1951 when sales totaled $457,060,766.

Allis-Chalmers has spent or has committed to spend $100 million improving facilities and expanding capacity through the post-war period. Roberts said that capital expenditures in 1952 totaled $12 million and A-C will spend just as much in 1953.

Hotpoint

John C. Sharp, president of Hotpoint, has revealed that the company expects to increase its business about 25% in 1953 and anticipates expanded volume by 1960 that will represent sales on a number of its appliances at six times current levels.

Sharp said Hotpoint purchased $33 million worth of production materials in 1952 and anticipates that this will reach $108 million by 1960.

He gave the following projections of industry sales for the period:

	1952	1960
Ranges	1,000,000	2,800,000
Water Heaters	720,000	1,800,000
Dishwashers	200,000	850,000
Automatic Washers	1,600,000	2,500,000
Refrigerators	3,400,000	4,500,000
Freezers	1,200,000	1,600,000

The Hotpoint president reveals that the firm enters 1953 in a good competitive position. He also said the appliance industry will enter 1953 in a much more healthy condition than a year ago.

Philco

In forecasting a prosperous 1953 for American business, William Balderston, president of Philco, predicted a record year for manufacturers of television receivers and most household appliances.

Balderston said Philco sales in 1952 exceeded $350 million—a record for the corporation. Philco has increased its share of the market for each of the major items it produces, such as television receivers, radios, refrigerators, home freezers, ranges, and air conditioning units and expects further sales gains in 1953, he said.

Perhaps the fastest-growing market in the country is that for room air conditioners, Balderston commented. About 325,00 units were sold in 1952 and we estimated about 450,000 will be made and sold in 1953, he added.

(*Please turn to page* 48)

Outlook for Aluminum ... Plumbing ...

When emergencies cripple your system

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That's why — when elements strike — utilities call Graybar first. From experience, they've discovered Graybar's stand-out facilities for delivering emergency replacement items *fast* — wherever and whenever they're needed.

• A nation-wide network of Graybar offices and warehouses provides ready accessibility to stocks of essential pole-line supplies.

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• Alert Graybar suppliers are always willing to co-operate in filling extraordinary needs . . . to add their weight to Graybar's own services.

The next time *you* need emergency help, make it a point to call your near-by Graybar office. You're sure to get efficient, helpful service — the kind of service that's invaluable in emergencies . . . a necessity in everyday operations.

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GRAYBAR ELECTRIC CO., INC.
Executive Offices:
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IN OVER 100 PRINCIPAL CITIES

Outlook for Aluminum Producers Is Bright

The nation's aluminum industry enjoyed a record breaking production of primary aluminum in 1952. This was achieved despite a tug-of-war waged between the defense program and civilian markets for the nonferrous metal. The supply situation was also hampered by the power shortages of the Pacific Northwest and the South, and the delay in new plant construction caused by the steel strike.

Despite these adverse conditions, the 1952 production is estimated to be close to 1.9 billion lb, an all-time high and 11% greater than 1951 output.

Although the expansion program of the U. S. aluminum industry is continuing at top speed, it is not yet completed. New producers are being brought into the picture and existing aluminum companies are in the process of completing additional facilities.

Assists Expansion Program . . . To carry out its share of the program Alcoa is spending more than $300 million. During 1952 Alcoa began production of primary aluminum at the Wenatchee (Wash.) and Rockdale (Tex.) plants and added 35,000 tons of additional capacity to its Point Comfort (Tex.) plant. The company also started operations at its new alumina plant at Bauxite, Ark. Alcoa also announced plans to build a $400-million smelting project near Skagway, Alaska.

Since 1952's aluminum record has hit a new high, the industry can now look forward to another year of dynamic growth in 1953.

"There will be plenty of aluminum for all who want it before the middle of 1953, in our opinion, unless there is an extension of hostilities," Richard S. Reynolds, Jr, president of Reynolds Metals Co, has predicted.

Pres Reynolds said the big surge in actual production is coming in 1953 and 1954, with an output of 2.5 billion lb expected in 1953, and about 3 billion lb in 1954.

Reynolds Metals' 1952 output, which sets a new company record, is estimated at 552 million lb, which will be 13% higher than in 1951. When the company's expansion program is completed in 1953, Reynolds said annual production capacity will be 830 million lb, more than five times as great as it was at the close of World War II.

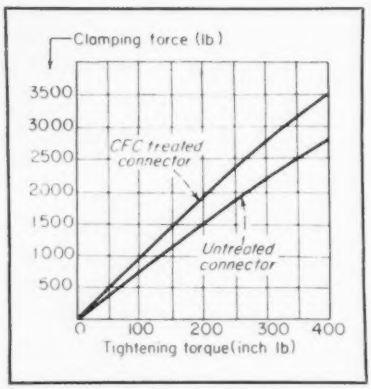
Blackburn's New Process Ups Connector Efficiency

A new chemical process for increasing the mechanical efficiency of copper alloy split-bolt conectors has been announced by Jasper Blackburn Corp, St. Louis, Mo.

The process, Blackburn reveals, consists of a series of chemical dip treatments which form a microscopically thin, tightly adherent film which has extreme pressure lubricating characteristics and excellent corrosion and oxidation resistance qualities.

Primary purpose of the chemical treatment is to increase the clamping force on the connected cables and so increase the conductivity of the joint. The increase of conductivity results from the breakdown of the oxide film normally present on copper wire and to the broader contact areas created by the higher pressure.

In addition, the larger areas of contact between the strands of the wires prevent slipping and reorientation of the strands which would cause a gradual loosening of the connection over a period of time. High pressure between the strands is also said to effectively seal out air and moisture which bring about oxidation and corrosion.



CLAMPING FORCES developed by treated and untreated No. 2 stranded wire connectors

Blackburn's new treatment is illustrated in the chart. The firm claims a normal increase in clamping force of over 25% for a given torque by the use of the new chemical process. The exact amount of the increase, Blackburn says, is dependent on the combination of alloys used, in some instances increases as high as 50% in clamping force have been obtained.

MEETINGS CALENDAR

Edison Electric Institute
Accident Prevention Committee, Hotel Muehlebach, Kansas City, Mo., Jan. 12-13; Prime Movers Committee, Mayflower Hotel, Akron, Ohio, Feb. 2-3; Transmission-Distribution Committee, Shoreham Hotel, Washington, D. C., Feb. 12-13; Electrical Equipment Committee, Jefferson Hotel, St. Louis, Mo., Feb. 16-17; 19th Annual Sales Conference, Edgewater Beach Hotel, Chicago, March 30-April 2.

Institute of Radio Engineers
Joint High Frequency Measurements Conference with AIEE, Statler Hotel, Washington, D. C., Jan. 14-16. National Convention-Exhibit, Waldorf-Astoria Hotel and Grand Central Palace, New York, March 23-26.

Canadian Electrical Association
Eastern Zone: Engineering Division, Nova Scotian Hotel, Halifax, N. S., Jan. 15-16; Sales Division, General Brock Hotel, Niagara Falls, Ont., Jan. 22-23; General Division, Mont Tremblant Lodge, Mont Tremblant, Que., Jan. 29-30; Following Western Zone Division Meetings will be held at Palliser Hotel, Calgary, Alta.; Engineering, Feb. 23-25; General Division, Feb. 25-26; Sales Division, Feb. 26-27.

American Institute of Electrical Engineers
Winter General Meeting, Hotel Statler, New York, Jan. 19-23.

National Rural Electric Cooperative Association
11th Annual Meeting, Civic Auditorium, San Francisco, Jan. 26-29.

Public Utilities Advertising Association
Region 8 Meeting, Mayor Hotel, Tulsa, Okla., Feb. 2-3.

National Association of Corrosion Engineers
Short Course in Corrosion in cooperation with University of California, Berkeley, Feb. 2-6.

Missouri Valley Electric Association
Industrial-Commercial Sales Conference, President Hotel, Kansas City, Mo., Feb. 5-6.

Pennsylvania Electric Association
Joint Meeting of Electrical Equipment-Relay Committees, Roosevelt Hotel, Pittsburgh, Feb. 5-6; Hydraulic Power Committee, Hotel Roosevelt, Pittsburgh, Feb. 5-6; Transmission—Distribution Committee, William Penn Hotel, Pittsburgh, Feb. 12-13; Systems Operation Committee, Hotel Brunswick, Lancaster, Pa., Feb. 19-20.

Maryland Utilities Association
Annual Meeting, Lord Baltimore Hotel, Baltimore, Feb. 17.

National Adequate Wiring Conference
La Salle Hotel, Chicago, Feb. 26-27.

Southern Safety Conference-Exposition
Hotel Atlanta Biltmore, Atlanta, Ga., March 1-3.

North Central Electric Association
Electrical Industries Meet, Hotel Nicollet, Minneapolis, March 8-11.

North Central Electrical Industries
1953 Electrical Industry Convention, Hotel Nicollett, Minneapolis, March 8-11.

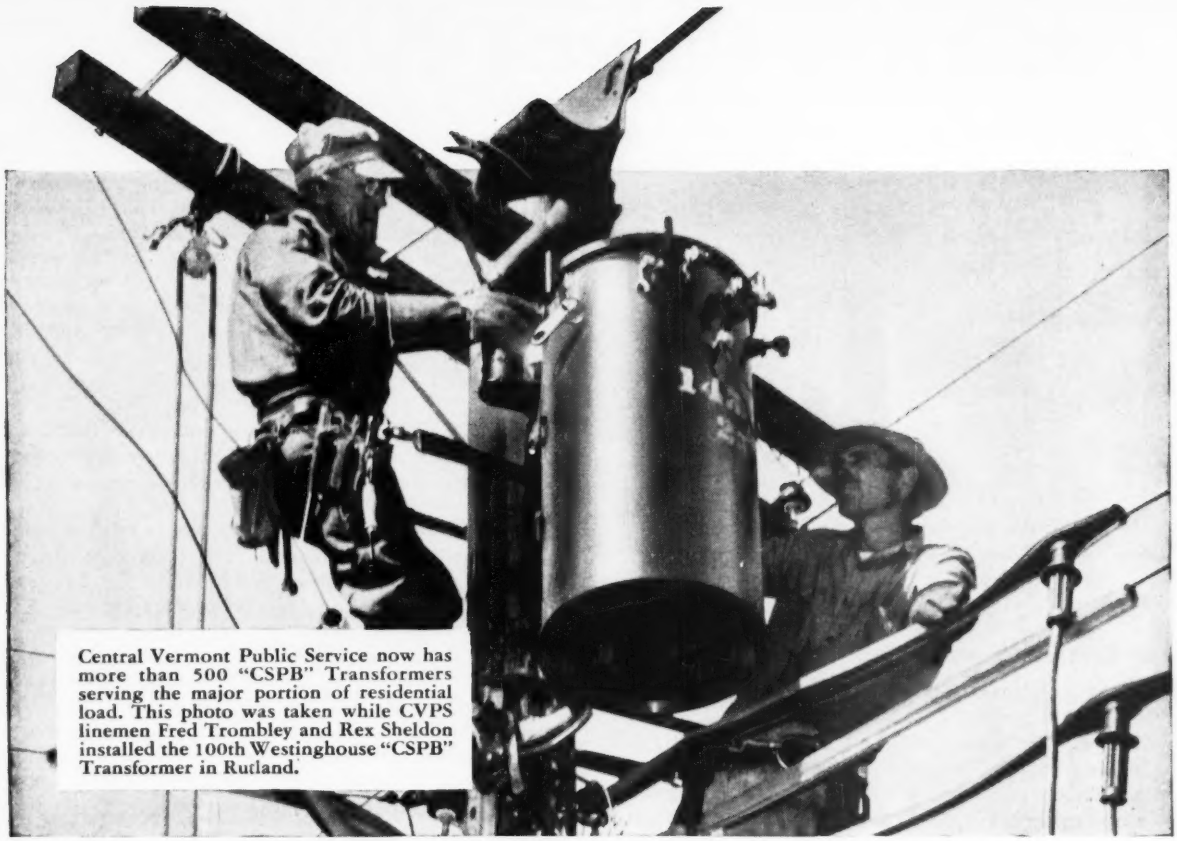
National Electrical Manufacturers Association
Winter Meeting, Edgewater Beach Hotel, Chicago, March 9-12.

Illuminating Engineering Society
Canadian Regional Conference, Chateau Laurier, Ottawa, Ont., March 23-24.

Southeastern Electric Exchange
20th Annual Conference, Boca Ration Hotel, Boca Ration, Fla., March 23-24.

A&M College of Texas
Conference for Protective Relay Engineers, Dept. of Electrical Engineering, College Station, Tex., March 23-25.

Oklahoma Utilities Association Convention
Tulsa Hotel, Tulsa, March 26-27.



Central Vermont Public Service now has more than 500 "CSPB" Transformers serving the major portion of residential load. This photo was taken while CVPS linemen Fred Trombley and Rex Sheldon installed the 100th Westinghouse "CSPB" Transformer in Rutland.

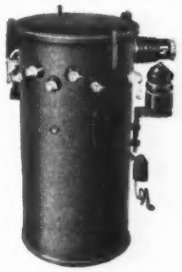
"CSPB®" Transformers take the heat off Rutland's load problem

Heavy loading of radial distribution made it necessary for Central Vermont Public Service to increase capacity at once. Future growth was certain.

They provided immediate capacity by banking with "CSPB" Transformers. Then, by simply changing to higher ratings, or adding more transformers, future growth could be handled economically.

For years, tying secondaries together has been recognized as providing the ultimate in transformer flexibility. But only with "CSPB" Transformers, first introduced by Westinghouse in 1946, can you eliminate the danger that sudden overloads or faults might cascade onto other transformers, and blank out the entire system. Here's why:

Two secondary breakers with warning signals function in each "CSPB" Transformer; one to serve each section of the secondaries. Secondaries are tied together only through the transformer. Therefore, "CSPB" Transformers first provide signal-light indication of a section operating at dangerous overload; then completely isolate severely overloaded or faulted sections...if that should become necessary to maintain service on the balance of the system.



Ask your Westinghouse representative for complete information, or write direct for Booklet B-4310A. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

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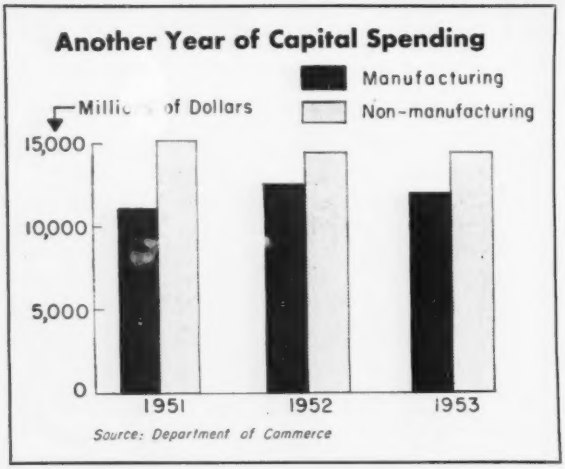
YOU CAN BE SURE...IF IT'S Westinghouse

ELECTRICAL BUSINESS OUTLOOK



Good Signs for the New Year

Retail sales have turned upward, and business plans continuation of heavy capital spending

The year 1952 ended with some bright notes for the 1953 business outlook. Industrial production was setting a new peacetime record with every passing month, and consumers were buying heavily. Of course, all the signs are not so good. But here are some of the ones that are.

Confirmation of business plans for heavy capital spending in 1953 is one. The Department of Commerce expects business to invest about $26,270 million in new plants and equipment—just about 2.2% less than last year.

The Commerce survey backs up conclusions from the McGraw-Hill preliminary survey made last October (EW, Nov. 10, p 50). It shows that most changes in business capital investment planning since then have been increases rather than declines. And it shows that non-manufacturing industry—not covered in the McGraw-Hill survey—will spend almost as much in 1953 as in 1952.

Basic Industries Will Spend Less . . . Manufacturing industries plan to cut expenditures about 4.4% this year. But the whole change is in the durable goods industries, down 9.3%. Big drops are in basic industries like nonferrous metals, iron and steel, and transportation equipment—mostly aircraft. Declines here are traceable largely to the approaching completion of defense-stimulated expansion programs.

Not all durable goods makers are cutting back; machinery and electrical machinery industries will spend more. And makers of non-durable goods, as a group, plan to spend just as much in 1953 as in 1952. Only sharp cutback planned is in the overexpanded textile industry.

Of the big non-manufacturing industries, only railroads are planning an abrupt cutback. Their big dieselization program is nearing completion. Transportation and communications industries are also cutting back slightly.

Mining companies, public utilities, and commercial and "miscellaneous" business will all spend more. Increases in capital spending plans of commercial business result from the ending of controls and shortages that have held back building for the past two years. Shortages in 1952 also pushed some spending by utilities back into 1953.

The size of all these plans for new plant and equipment means that capital spending will stay close to its present very high level through the first half of 1953. And, if general business stays good, there may be little or no decline in capital expenditures at any time this year.

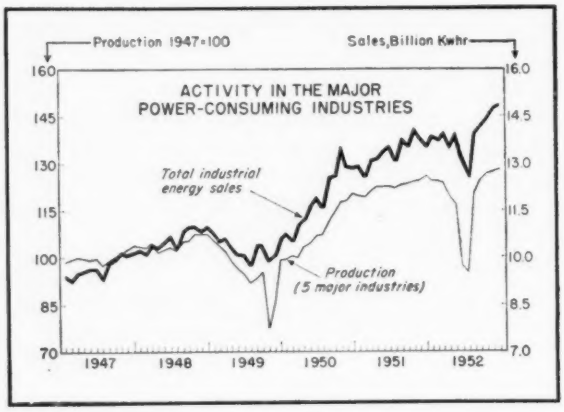
On the other hand, a slump in sales could make businessmen cut their plans; the McGraw-Hill survey in October showed business ready to retrench if trouble develops.

Retail Sales Are High . . . The big upturn in retail sales is another good sign for business. Total retail sales in the fourth quarter of 1952 ran an estimated 7% ahead of the same period in 1951. And this was not scare buying—just a normal rate for the present level of consumer income.

There's still some question as to whether this rate of sales —high as it is—is enough to justify the great expansion in production of consumer goods industries. Probably not; textiles, appliances, autos, and others all may be forced to cut back somewhat at some time in 1953. But sales to consumers are expected to stay high.

General optimism among businessmen must be counted another of the recent favorable signs in the business outlook. Whether the Republican victory, the fall upturn in sales, or the swift rise in industrial production is the chief element behind this optimism is not clear. But the general feeling that business will be good is undoubtedly behind some of the recent increases in capital spending plans.

Finally, housing activity all through the fall showed more signs of vitality than it had for more than a year. Last year wound up as the second highest on record for non-farm housing starts, behind only stupendous 1950. And the big total of more than 1.1 million starts came largely as the result of a rising annual rate of starts toward the end of the year. Housing starts may not go so high again this year. But anyway 1953 will start off at a high level.



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167 kva to 500 kva Distribution Transformers

because –

They are designed and built to withstand severe operating conditions and excessive load demands efficiently and without interrupting service. This is true because Moloney incorporates these superior design features in all of its products.

1. Higher factor of safety

Liberal use of insulating materials and coil cooling ducts makes possible greater performance dependability under overload conditions for a longer time. Greater mechanical strength permits them to withstand severe overload conditions without damage or mechanical distortion.

2. Improved short-time overload capacity

Distribution transformers, during peak load periods, may carry loads greatly in excess of rated capacity. The lower winding temperature gradient of Moloney Transformers makes it possible for them to carry severe overloads without seriously affecting their operating life.

3. Surge-proved core-and-coil design

All Moloney transformers are of surge-proved core-and-coil design tested on our 3,600,000 volt surge generator. Periodic surge-testing of standard designs assures continuous quality control. With Moloney Distribution Transformers you are sure of high resistance to the effects of lightning surges.

MEBB-29

Illustrated at left: Moloney Distribution Transformer rated 500 Kva, single-phase, 60 cycles, high voltage 7200 volts, low voltage 240x480 volts.

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Manufacturers of Power Transformers • Distribution Transformers • Load Ratio Control Transformers Step Voltage Regulators • Unit Substations

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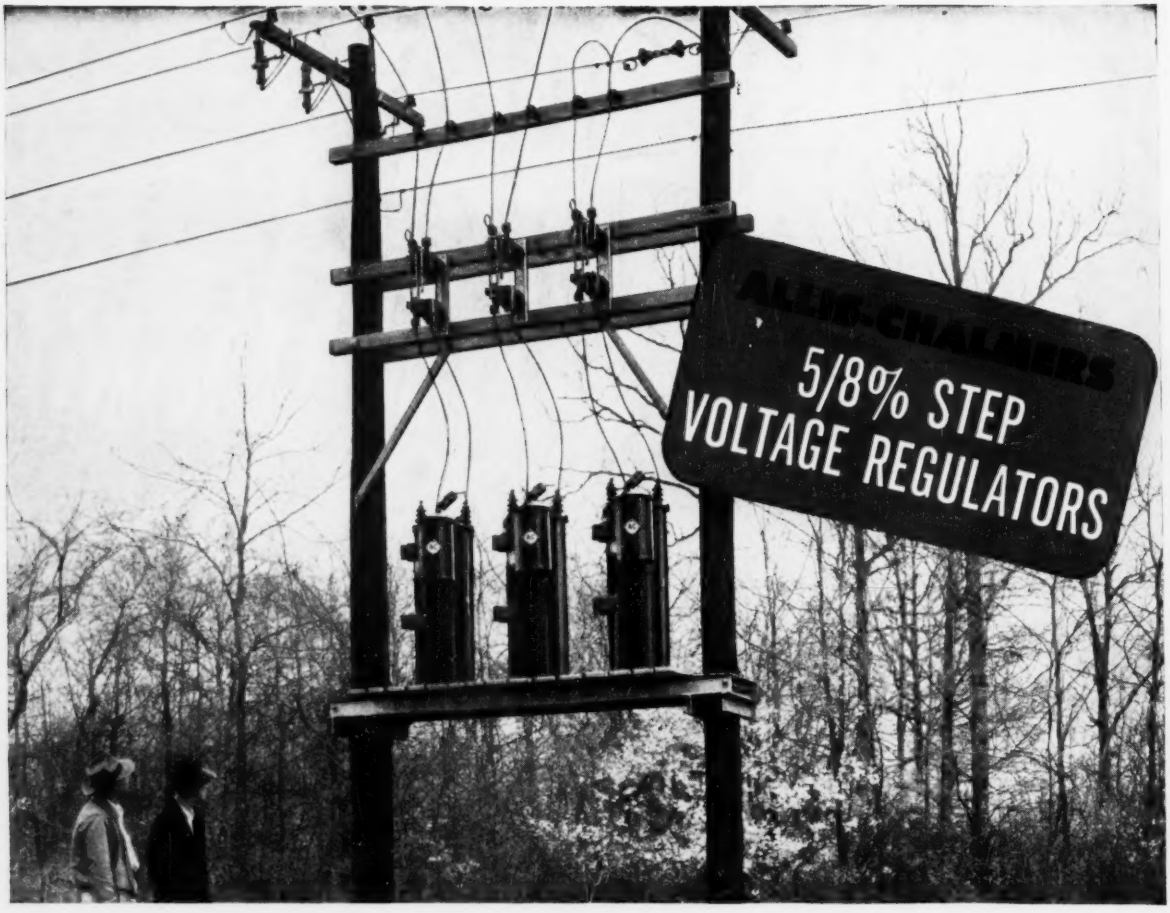

Get Voltage Regulation at Low Cost

With All 32-Step Regulator Advantages

HERE'S THE ANSWER to your voltage problems. Allis-Chalmers distribution regulators are low in cost. They are easy to install, simple to maintain. And they give *all* the advantages of Allis-Chalmers ⅝% step regulation: a narrow ± 1 volt band, 20% range of regulation, long-life contacts, and *Feather-Touch* control.

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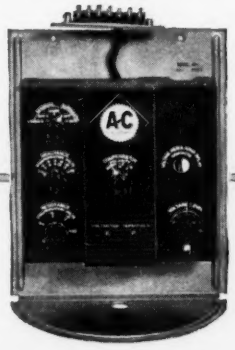
Feather-Touch *Control Simplifies Installation*

There's just one adjustment to make when installing — set the calibrated voltage level. For more facts, write for Bulletin 01M7866-1.



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Originators of ⅝% Step Regulation